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SOUTH AFRICAN MUSEUM

VOLUME XXXVII

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PART I, *containing:—*

1. *The Bored Stones of South Africa.* By A. J. H. Goodwin, M.A., F.R.S.S.Afr., University of Cape Town, and Hon. Keeper of Ethnology in South African Museum. (With 9 Text-figures and 16 maps.)

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Addendum to *Barbus holubi*: see p. 262.

Corrigenda: Pp. 113, etc., and fig. 6 (map), wherever "*holubi*" occurs, read *aeneus*.

Pp. 120, 121, 153, for "Holub's" Yellow-fish, *read* Burchell's Yellow-fish.

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1.—*The Bored Stones of South Africa.* By A. J. H. Goodwin, M.A., F.R.S.S.Afr., University of Cape Town, and Hon. Keeper of Ethnology in South African Museum.

(With 9 Text-figures and 16 Maps.)

(MS. received June 1944.)

PART I.—GENERAL PRINCIPLES AND METHOD.

It is our intention to discuss the prehistoric and protohistoric examples of the bored stones of the Union, area by area, and type by type. In undertaking such a task it is essential to remember that the material of such a survey is useless in itself: it has value only as a source of legitimate deduction. It is obvious that we are dealing with a great mass of undigested evidence, of a series of superposed and, in some cases, completely independent cultural movements, into whose history we are attempting to gain an insight.

Our evidence is bad. The very abundance of our material has made us careless in the collection of data. Where stratigraphy has been present it has been ignored, and in many instances no attempt has been made to give or to record the exact localities of our finds.

Whatever results we may achieve here can only be regarded as tentative and incomplete: a framework into which new material can be built, permitting clearer, more precise deduction. Data are here limited to the Union, though I had hoped to extend the field further. The chances of discovery outside the Union are slight, and only isolated areas have been searched. The distances between specimen and specimen are too great to permit of legitimate deduction, and the numbers of examples are too small to be of use at present. It is most sincerely to be hoped that a similar study will be extended to the Rhodesias, while the raw material for such a survey in the Belgian Congo has already been collected and published.

Introductory.

Of all the stone implements so abundantly found in South Africa, the bored stone or "!kwe" * has attracted the most widespread interest. The reasons for this popular interest are not far to seek. They are the most easily recognizable implements of the Later Stone Age, and the most widespread. Their symmetry, the trouble taken in boring the central hole, its obvious artificial origin; the surprise that so simple a people could have created so artistically simple a form; and the abundance of material on superficial sites, have all caused examples to be collected and kept by the finders as door-stops, manger-weights, or paper-weights. They are frequently sent to museums with the minimum of information, either singly or in bulk. No knowledge of provenance, associations or the type of deposit is available for over half the specimens. In some cases this is the fault of the collector, in others the museum assistants are to blame, more especially in the early days when cataloguing and marking were done by minor assistants with no knowledge of the subject.

The bored stone is sufficiently widespread to need some sort of explanation as a phenomenon, and numbers of legends have accumulated regarding their use. Many of these are complete fabrications, and it is essential to note that the European is by no means the worst offender. Native informants have gladly provided farmers and archaeologists with invented theories, and quite as happily support these by personal reminiscences. Some of these legends will be dealt with as they arise.

As a result of all this, and owing to casual generalisations on the part of those who should have known better, numerous inaccuracies have been published. There is scarcely a single adequate description in any scientific paper, and a thorough resurvey is therefore essential. It was partly to have some factual basis for future generalisations concerning size, shape, and distribution that I started collecting data some twenty years ago. Other intentions were to provide a framework into which local discoveries could be fitted, to discover if any certain relationship existed between the bored stones and Later Stone Age cultures, either locally or generally, to discover the limits of tribal hunting areas, and to plot migrations. It was intended to provide a general survey of distribution and association. This failed at the time through lack of exact data accompanying the bored stones.

* See Péringuey, Annals of the S. Afr. Mus., vol. viii, 1911, p. 107.

The present work consists of the digestion of a great quantity of data, made available to me through the kindness of various museums and private collectors. The work began in 1923, as a small part of the vast amount of checking, measuring, comparison, and typological and distributional study which led me to formulate the existing stone implement classification. The work entailed has already been cursorily dealt with elsewhere,* and need hardly be laboured here.

Independent field work by Col. Hardy, Dr. Hewitt, Dr. Heese, Professor van Riet Lowe, myself and others, has borne out that the so-called !kwe or !kibi (terms applied by Stow and other writers to all forms of bored stone) are variously associable in southern Africa with Smithfield, Wilton, coastal midden, and Bantu sites. The insistent Bantu tradition in the Transvaal shows that they were used in earlier days as make-weights for digging sticks (subsequently stated to have been hoes, on the statement of an old male) by the women of several tribes, notably the BaTlokwa under the chieftainess MaNtatatisi. There the matter rested, except for a general accumulation of proof of a somewhat similar nature which added to the list of names of Transvaal Bantu tribes using bored stones. Engelbrecht in his study of the Korana states that bored stones were used for digging by that Hottentot tribe, the only satisfactory reference we have to their use by this people,† though the Bushman use of the bored stone is well and consistently authenticated by early travellers and explorers.

In 1926 this survey was dropped, after a considerable number of measurements had been accumulated. When the war broke out, and military duties limited my ability to continue work in the field, I was inspired by Major Oliver H. Myers (a name well known in Egyptian archaeology) to take up the survey once again. My results are here published completely for the first time, though a cyclostyled ‡ Preliminary Survey, in four parts, was published during 1942. In the Preliminary Survey the known figures were listed, and an initial attempt was made to formulate some of the theories dealt with more

* A. J. H. Goodwin, Man, 1927, Art. 14; also in Africa, vol. ii, 1929, pp. 174 *et seq.*

† Sir Langham Dale refers in an early publication to the use of bored stones as digging-stick stones and as weapons of war by the Hottentots at Wupperthal, and regrets the absence of further evidence.

‡ Goodwin, A. J. H., A Preliminary Survey of the Bored Stones of South Africa. Published by the School of African Studies, the University of Cape Town. Cape Town, 1942.

fully in the present paper. At that time no attempt was made to discuss the migrations of the prehistoric types. The present publication therefore includes much material not previously published, and in addition gives deductions and theories not given elsewhere.

General Principles.

As this is the first full chorological survey attempted in South Africa, it would be well to outline the general principles of our methods as an aid to future workers. I here employ a fundamentally statistical approach, which provides an ethnological tool as certain as that of geology in the earlier prehistoric field, and of far greater importance in the later phases of man's history. Work of this nature should be limited by certain strict rules. It depends fundamentally upon deductions or logical judgments, made from available data, while speculation (probability suggested by an insufficiency of available data) must not be permitted to affect the main issues of the survey. It may be cited as a fruitful field for future study.*

1. A survey should confine itself to strictly comparable data, in this case the bored stones of South Africa.

2. All available material and exact data should be obtained, analysed, and employed without suppression. In South Africa only one important source of material has been debarred from me, and all available sources have been employed.

3. A fundamental basis for comparison should be sought, and in the present work a few simple measurements are used.

4. A simple technique for analysis should be employed. Here I have used the map and the centimetre graph paper. These represent the study of dispersal and the analysis into localized types.

5. While the cultural uses of an element of culture should be defined, these are not essentials to the validity of the survey. The obvious failure in the present paper to differentiate absolutely and precisely between such uses as digging-stones, knob-kerrie heads, etc., is admitted, but this does not affect the fundamental facts of distribution.

6. Extraneous factors should be eliminated. Such points as the exact petrology and attribution of types of stone are regarded as unimportant to the survey.

7. Local environment must be constantly studied, and the deductions made from distributional statistics measured against this highly

* See A. J. H. Goodwin, "Method in Prehistory," S. Afr. Arch. Soc. Handbook I, 1946, chap. xiii.

important ethnological factor. The intention here is to deduce the geographical areas of attraction, migrational routes, and the natural barriers confining them.

8. The study of attracters, barriers, and migration routes has a local and a general application. It is local in that it defines our specific routes and areas for future exact ethnological study, and general in so far as it augments our knowledge of the fundamental laws governing man's movements and concentrations.

9. All reasonable deductions regarding the race, culture, mode of life, etc., of the users should be employed. Where deduction is not possible, probabilities may be stated as speculations worthy of consideration, but must not be permitted to affect the major issues of the survey. A clear distinction between deduction and speculation must be observed.

10. Any general theories based upon the material must be sufficiently inclusive to cover about nine-tenths of the available data, about one-tenth being permitted for anomalous types and personal peculiarities.

11. Speculations based upon casual study, even of large numbers of single instances over a period of time, are extremely dangerous, misleading, and incorrect. They belong to the realm of popular fancy.

Types and Ethnology.

Though the figures given in this study are divided into three main groups—Prehistoric, Bantu, and Tlokwa—there are in reality four series. The first two may be regarded as acceptable. The third is slightly more speculative; the fourth is highly speculative at present, but further evidence may provide convincing proof.

1. Prehistoric Series: Going back into the Later Stone Age, and apparently not preceding that general era. These stones can be associated with certainty at various sites with one or more of the following elements: Smithfield B, C, N; Wilton; Coastal Middens; Pottery; Rock-paintings; Petroglyphs. Apart from definite association, they are generally associated, in that they appear with high frequency from surface sites where those elements occur, or in the immediate neighbourhood. Association is only specifically mentioned in cases where it is certain. General association is mentioned in the prefatory note preceding each area. Exact association has proved to be disappointingly rare.

2. Bantu Series: Belonging to the nineteenth century, and perhaps the eighteenth, and demonstrably in use by a cattle-keeping people

(by reason of distribution) who practised agriculture and employed the typically Mediterranean technique of terracing. There may or may not be a direct association between the bored stone and proto-historic gold working, but terracing provides an indubitable link between the two complexes.

3. The Mantatees * drive into the Upper Molopo-Groenwater area: This is historical, and the association of bored stones with the Tlokwa of the period has similar historical backing. A slight element of speculation enters here, not sufficient to condemn all the specimens, but perhaps enough to raise doubts as to certain individual allocations (p. 175).

4. The Mantatees refugee period: After their disastrous battle with the Griquas near Litako and Kuruman, we know from various sources that the Tlokwa refugees were scattered throughout the Cape of Good Hope. We also know that bored stones of the large type associable elsewhere with the Bantu are scattered over the same area. Association is highly speculative, and for that reason the examples are left in their places within the *cadre* of prehistoric series, and are not separated out.

General Typology.

In discussing the distribution of types it behoves us to consider the value of the distributional method as applicable specifically to the field of prehistory, employing the present material as an example. The evidence at our disposal goes to show that the position is a complicated one. In examining the "Bored Stones" we are not dealing with a single cultural element, nor are we dealing with a technique employed by a single cultural group. We are not even dealing with a single period. To elucidate the position let me augment the categories given earlier (Prehistoric, Bantu, Tlokwa) by discussing the bored stone from the viewpoint of probable usage. The arrangement is by size.

i. The Bantu digging-stones, used by the women agriculturists of the Eastern Transvaal, and carried by them through Kurechane, Litako, and Kuruman, and, presumably, down the Groenwater valley and across the Cape Province.

ii. The prehistoric digging-stone, unassociated with agriculture,

* BaTlokwa and other tribes under the chieftainess MaNtatisi. The form Makatees is also commonly used at the Cape for these people. "Tlokwa" would only represent the nuclear tribe in this great migration which will be discussed in detail later (p. 202).

and used by women food-collectors, of the general "Bushman" peoples of South Africa. It is vouched for as a Bushman tool, is frequently depicted in paintings, and was in use until late in the last century. The terms *!kwe* and *!kibi* are often applied to it in local literature of the period.

iii. The stone-headed club represented in paintings. The Hottentot (?) term *kiri* (presumably cognate with *!kibi*) seems to have been generally applied to this weapon and its wooden derivative by the early settlers, whence the Afrikaans *knopkierie* and the English *knobkerry* or *knobkiri*. This weapon may well have been adopted by the men of any of the South African tribes—Bantu, Hottentot, or Bushman. It is obviously a man's weapon. In this group we can tentatively include the "macehead," generally pyriform and carefully tooled, deeply bored from one face only.

iv. Stone dagga-pipes for smoking hemp (*Cannabis sativa*). These are historically late, having been introduced with hemp by the East Coast Arabs probably from the Sofala region through Bantu tribes on the Zambesi, from whence it spread northwards (*e.g.* to the Ba-Shilange on the Lulua-Kasai) and southwards to the Sotho-Tswana people in the Union. We may regard these as masculine, for amongst most peoples the use of strong narcotics and stimulants is permitted exclusively (or more generously) to the male.

v. The pebble disc, common only in certain areas, usually within easy reach of the coast, where flat beach pebbles are easily available. This is presumably a variant of the digging-stone, a woman's tool. The inland discs in contrast are generally of shale or some analogous material.

vi. The edged disc and stone "arm-ring," the former patently a stage in the making of the latter. The term "arm-ring" has been questioned elsewhere.* If it is an ornament it is presumably male (see Appendix II).

vii. A further type that may be watched for is the "ring"; a small stone, with an index between 40 per cent. and 60 per cent., in which the mouth of the bore exceeds the height of the stone. These are products of the technique of boring, and obviously reflect the use of a coarse drill or pecker. Even this slight variation may be cultural. Mainly confined to the South Coast and the Cape.

viii. "Stone beads," bored stones less than 3 cm. in diameter, of

* Goodwin, A. J. H., "Edged Discs and Armrings," S. Afr. J. Sci., 1943, vol. xl, pp. 296–302.

which relatively few are represented here. These are certainly Bantu in most instances.

ix. Elongated types. In general we have to presume that the elongated examples are variants of the circular. There is, as yet, no means by which we can link the two series with certainty, and here again we must not lose sight of the possibility that we are dealing with a separate cultural spread, quite unrelated to some or all of the above.

Finally it must be remembered that we are dealing with implements in three stages of manufacture: incompletely bored, completely bored, and with the finished aperture enlarged by intensive usage. This last will be dealt with further under the Use of Metal Tools.

Manufacture.

It is first essential to discuss briefly the method by which these stones were bored and shaped. In general the technique seems to have been everywhere the same, though variants will be noted.

A suitable pebble was taken, and the piercing process was begun by pecking a hollow in the two opposing faces. This was done with a stone pecker, an instrument shaped by use, and found on most rich sites. In form it consists merely of an obtuse-angled natural or shaped stone drill, blunted and battered by usage. Numbers of discards occur at this stage. Some partly bored stones seem to have been cast aside for no particular reason, others have broken as the result of too hard a blow.

Once these two cup-shaped hollows met in the centre of the stone, the resulting aperture would be enlarged by means of a stone reamer or rimer. A long natural or shaped stone would be used, and would be inserted and rotated by hand until the hole was large enough. This rimer eventually developed a phallus-like form as a natural result of usage (fig. 1).

These two stages (pecking and reaming) provided the simplest form of bored stone, but in many cases further action was taken to shape the stone more nearly to the maker's fancy. In perhaps the majority of cases the outer surface of the stone has been battered to shape, by careful pitting over the whole surface by a laborious crumbling process. This is apparently true only in the Prehistoric Series, and the process is absent or rare among Bantu examples. It is also possible that finished stones were sometimes polished over the whole surface, and specimens with a black smoky polish are fairly frequent, though this

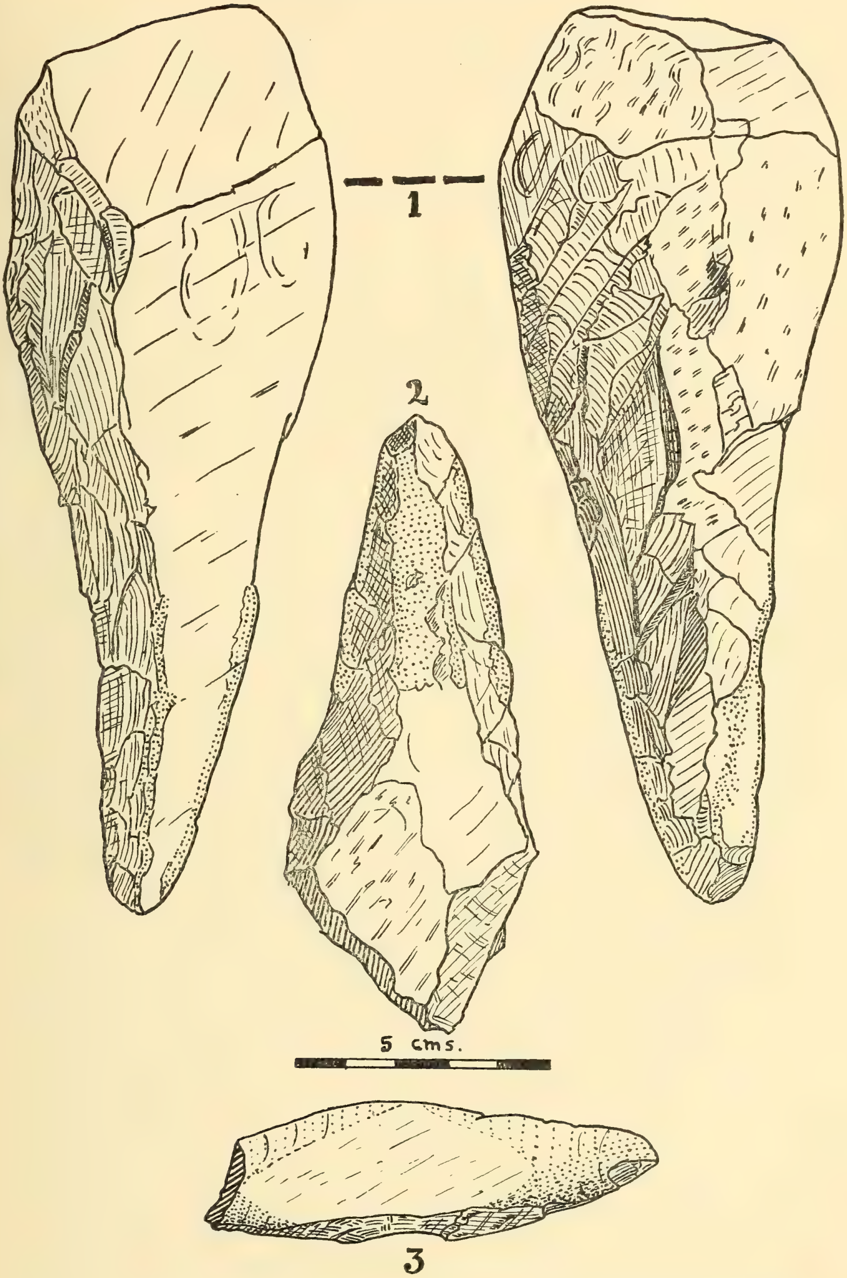


Fig. 1.—Rimers, from: 1, a shelter near Wellington (Univ. Stell. Col.); 2, Noordhoek kitchen-midden (U.C.T. Col.); 3, Alexandra Hospital, Pinelands; Stippling shows points of wear. (Hardy Col. U.C.T.)

may be the result of grass fires. In most cases I have noted that the stone has been shaped or pecked, but these are not to be regarded as unusual. In most cases evidence has not been submitted to me, and in a number of specimens natural agencies may have produced a similar effect.

In certain instances (notably, though not exclusively, in the Vaal area, and related to the rare "pyriform" or "macehead" examples) there is evidence of "tooling" over the whole surface. Pitting on the pecked examples is regularly distributed, but on the tooled specimens there appear to be distinct "chatter marks" or regular lines of pitting, as though a metal tool had been employed. These lines of chatter are generally to be observed more or less radially to the mouth of the bore, covering the whole surface of the stone in much the same way that chatter marks cover the face of a modern tooled foundation stone.

The Use of Metal Borers.

While there is some reason for the belief that metal borers of some sort were employed in certain instances by the Bantu—and even perhaps by late prehistoric peoples—there is no certain proof available. Two types of bore, the cylindrical and the conical (in contrast to the usual hour-glass or biconical bore), have been attributed by various writers to the use of metal borers. In all the specimens I have examined the "cylindrical bore" is far more likely to have been the result of hard wear in use, and cannot reasonably be attributed to the use either of metal, or to the "reed and sand" method employed in Neolithic Europe. Here and there the term "choke bored" is added after the description of specimens; this is not my comment, but refers to stones measured by my correspondents and helpers.

There would seem to be a fairly prevalent belief among Europeans that the use of a metal bit should produce a cylindrical hole. In practice the conical and biconical bores can be more easily obtained with a triangular metal borer. The cylindrical hole needs a borer of such a type that it will permit of the escape of the powdered stone as the hole is drilled. A European "jumper drill" with a cross-shaped section would serve the purpose. It is far more likely that the Bantu would employ a common native hoe-tang or axe-tang for the purpose, which would yield a conical or biconical bore. This tool would consist of a flat piece of iron, about a quarter of an inch thick, and tapering to a rough point from a diameter of 2 inches (5 cm.). This would produce just such types of bore as we find. There is seldom proof that iron was employed on a particular specimen.

The narrow conical bores are in a somewhat different category. Oddly enough none of these have been attributed to the Bantu. In size and proportions they appear to fall into the Prehistoric Series.

	Diam.	Ht.	Mouths of Bore.		Angle.
Leydsdorp . . .	7·8	5·8	3·6	2·2	14°
Welbedacht . . .	10·6	7·4	3·0	1·4	12°
Zwartruggens . . .	12·0	8·2	3·0	1·4	10°
Klerksdorp . . .	11·0	6·8	4·0	1·6	20°
Bloemhof A . . .	11·4	7·0	4·0	3·6	7°
Tygerfontein, Hoopstad .	9·6	7·3	2·9	0·5	20°
Douglas	10·2	9·5	3·4	1·5	13°
Blaauwheuvel. . .	8·7	4·6	3·5	2·2	14°
Smithfield . . .	9·0	5·1	4·0	2·5	21°
Knysna	9·0	4·9	4·6	2·8	17°

The distribution is mainly confined to the Western Transvaal and the Free State areas, where Bantu peoples have long existed. The fact that all specimens fit perfectly into local Prehistoric Series, and in addition their generally small size (compared with known Bantu material) suggest that these are protohistoric and that iron was obtainable from the neighbouring early Bantu. (See later, under V.M.R. area.) The similarity in size of the last three examples is suggestive.

An additional specimen (M.M.K. 1535), a large bead from Newlands, Barkly West (4·9 × 3·7; bore about 0·8, tapering to 0·3 cm.), has quite certainly been made with fencing wire or some similar thin metal. This example is almost small enough to fall into the "bead" group. It has split longitudinally.

The use of a tube for boring was known in Europe in Neolithic times. A bamboo or reed was rotated in the stone, constantly fed with sand and water as an abrasive. This action cut an ever-deepening circle into the stone, producing a cylindrical bore in the stone and in addition yielding a cylindrical core of stone of a type unknown here. In the case of unfinished European specimens this core stands isolated in the incomplete bore; an unmistakable object. This again is absent in South African sites.

The relationship of Bantu specimens to prehistoric is hardly discernible in the study of the bore, and we can presume that much the same boring methods were used. The histograms of all Bantu specimens, compared with 100 random Bushman examples, show a slight difference only (pp. 185–191).

	Hole Mouth.		Hole Centre.	
	Range.	Max. Frequency.	Range.	Max. Frequency.
Bantu . . .	1·9–8·7	5·0 cm.	1·1–7·7	2·45 cm.
Prehistoric . .	1·9–7·5	3·9 cm.	0·5–4·6	2·2 cm.

The largest of the Bantu hole-centres probably represents an old well-used specimen in soft stone. The smallest Bushman figure represents a small unfinished example. Further histograms may be worked out from the figures given, and may have some regional value; but owing to the unknown factors of material in both the bored stone and the stones used for boring, the histograms would have little value. The whole question of boring with metals will be dealt with again.

"Sacredness" of the Bored Stone.

It is evident that these stones were considered by their makers as of sufficient value to be shaped, smoothed, and finished off carefully. This suggests that shape and size were of some importance to the prehistoric users. Yet we can hardly attach any directly religious symbolism or significance to these stones. That they may have symbolized the female aspect of food-getting (agriculture or collecting) is perfectly possible, but a directly phallic representation is unlikely and without any factual justification. The use of the hoe among Bantu agriculturalists as a symbol of womanhood depends on a double foundation—the natural association of the hoe with the woman's life-work, and the use of the hoe in bride-price payments. This second basis is lacking in the Prehistoric Series of bored stones, so far as any available evidence goes.

To disprove the sacredness of the stones *per se* we may point out the number of instances in which these bored stones have been used as hammers or as upper grindstones; so frequent that we can only attribute these uses to the makers themselves. This does not suggest a "sacred object," but rather one of the ordinary everyday tools of a woman's life, or a man's weapon. It is of course quite possible that these stones had a secondary phallic significance, as they were generally used by women for digging, but speculation of this sort is not our affair.

The frequency with which completed stones are found split, so that

the two halves lie together, has been adduced as a proof of this sacredness. It has been suggested that they were deliberately broken, either on the death of the user, or to prevent the implement from falling into enemy hands. The obvious implication is simpler than this. A wooden digging-stick, if tight fitting, would be liable to swell and to burst the stone if allowed to get wet. This suggests chance fracture rather than "ritual breaking."

Size and Shape.*

In studying many hundreds of specimens, it has been found necessary to reduce description to a minimum. Much of the material has been measured at other centres, and a simple, uniform set of measurements has had to be developed. Four direct measurements are given for each complete circular specimen; and five for each of the elongated examples. From these certain indices are developed. Simplification of this sort can only be regarded as a conventional expression of the stone. It does not present the shape of the stone completely. Thus a sub-cylindrical form is not differentiated from the true prolate, sphere, or oblate, though this may be noted in the right-hand column. Evidence is not sufficient to yield results as to variations in shape, and I cannot make any deductions from the bulk of material that I have measured personally.

All these measurements have been taken in such a way as to represent the stone in its original entirety. Thus if a stone has been cleanly fractured, the shape is presumed to have been symmetrical, and an allowance made. Such figures are approximate and are given in brackets in all instances. They are accurate within a few millimetres. Worn specimens are similarly measured to allow for the abrasion of wear.

For circular specimens the following measurements are given in this order: maximum diameter and maximum height. These are followed by two figures, index and cube. The index is the percentage ratio of height to diameter, and depends upon the formula:

$$\frac{100 \times \text{ht.}}{\text{diam.}}$$

The "cube" represents a square box into which the stone would fit exactly, and is the product of the formula $d^2 \times h$.

* For some remarks on the use of the bored stone as a pipe-bowl for hemp-smoking, see Appendix I at the end of this work, also Laidler, P. W., in Trans. Roy. Soc. S. Afr., vol. xxvi, 1938, pp. 1–24.

These figures are followed by the external diameter of the larger mouth of the bore, and finally the minimum diameter towards the centre of the bore.

In the elongated examples the following figures are given: length, width, height, cube, mouth of hole, and minimum bore. It has not been found advisable to develop an index for this group. Cube is the product of l. × w. × ht.

By circular specimens is meant those which appear to the eye to be circular in plan; generally length does not exceed width by more than 8 per cent. of the length.

In the case of the prehistoric circular examples we can divide our specimens into rough terminological groups. The shapes depend upon the vertical section of specimens (*i.e.* the index), while sizes depend upon the cube. Where terms are used to designate a whole group, the average index and the average cube should be used to supply the term. I have here substituted "prolate" for the more cumbersome "hypsisphere," and give "oblate" as an alternative to "oval" of the Preliminary Survey.

Prolate .	over 110 per cent.;	oversized .	over 2000 cu. cm.
Spherical .	90–110 ,,	large . .	1350–2000 ,,
Subspherical	70– 90 ,,	large medium	800–1350 ,,
Oval (Oblate)	50– 70 ,,	medium .	450– 800 ,,
Suboval .	35– 50 ,,	small . .	180– 450 ,,
Oval disc .	20– 35 ,,	very small .	under 180 ,,
Disc . .	below 20 ,,		

The use of such terms cannot be hard and fast, and in discussing groups the term "disc" may be found to cover a group ranging from 15 per cent. to 40 per cent., while "sphere" may include specimens with indices of 85 per cent. to 105 per cent. Similarly "large" might apply to a group with a cube ranging from 1450 to 2200 cubic centimetres. These terms are given to help in the description of bored stones in future scientific descriptions of implement types, though it is most earnestly hoped that exact measurements will be given for each individual specimen as well.

Cube, Material and Weight.

The term "cube" employed here is misleading unless certain fundamentals are remembered. Owing to a strong mathematical tradition in our own society, we are prone to believe that the weight and volume of two spheres, one of 1000 cu. cm. and the other of 500 cu. cm., is in the relation of two to one. The "untutored savage," on the other hand, would regard a stone measuring 5·3 cm. in diameter

as only "slightly larger" than a sphere measuring 4·2 cm. in diameter, and, of course, the difference in diameter becomes of greater or lesser importance as the diameter of the spheres decreases or increases. The idea of "size" (apart from the mathematical concepts of mass, etc.) is probably a mental assessment of a combination of diameter and expected weight. In practice this should mean that the larger the type the greater the acceptable deviation in size (or the scatter when the type is represented on a graph paper), though I have not found this to be true in most instances given here.

It will be observed that neither the material nor the weight are here regarded as of primary importance. Where they are known they are given. The material can seldom be accurately analysed without the partial destruction of a specimen, and even then chemical or microscopic analysis would have to be carried out at suitable centres for some two thousand specimens. Vague terms, such as sandstone, shale, granite, soapstone, dolerite, slate, marble, quartzitic sandstone, have little real significance, save that they suggest the degree of hardness of the materials it was possible to work. Enough evidence is produced to show that all these materials were used, and were capable of being efficiently worked.

In a few instances, where a stone has distinctive local peculiarities and might with certainty be attributed to a particular outcrop, exact definition would be of great value; but even here it is to be observed that the material used need not bear any direct relationship to local petrology. Much of the material comes from a gravel source, and shows evidence of river pebble origin. It may have been carried by stream action for many miles from its source, or it may have been carried by man. There is no means of telling. If we were dealing with quarried stones (such as the bluestones at Stonehenge) the source of material would be of immense value in showing the direction of migration.

The exact assessment of weight is similarly of little value, as it is part of our own mathematical tradition. While the original pebble would probably have been chosen with an eye to weight, the boring subsequently removed a variable and uncertain quantity of the original stone. Weight has a broad value in dealing with unbroken specimens, but in many instances the exact weight could not be obtained from either the private or museum sources of material. Where it is known it has been given.

An approximation to weight can be obtained from the external dimensions, and "cube" in cubic centimetres can be roughly converted

into grammes by multiplying the cube by a factor. If the average diameter of the stone (or the cube root of the "cube," which is similar) is greater than 13·0 cm., the factor will be 1·6. If the average diameter lies between 6·0 cm. and 13·0 cm., use 1·55. If it is less than 6·0 cm., 1·5 gives the approximation. Thus:

100 cu. cm.	(root	4·65)	=150 grammes	(about	5·5 oz.			)
200 ,,	(,,	5·85)	=300 ,,	(,,	11	,,		)
300 ,,	(,,	6·7)	=465 ,,	(,,	1	lb.		)
500 ,,	(,,	7·94)	=775 ,,	(,,	1	,,	11 oz.	)
1000 ,,	(,,	10·0)	=1·55 kilos	(,,	3	,,	10 ,,	)
2000 ,,	(,,	12·6)	=3·1 ,,	(,,	7	,,	3 ,,	)
4000 ,,	(,,	15·9)	=6·4 ,,	(,,	14	,,	9 ,,	)

Weight has little relationship to shape, though it is obvious that, with the biconical bore, the higher a stone in relationship to diameter, the greater will be the quantity removed by boring. The material of which a stone is composed has some effect, but only in extreme cases (such as specular iron ore), and the figures above can be taken as reasonable approximations in most instances.

Copying.

While in the Bantu Series there seems to have been no real attempt to copy size or shape from traditional examples, the vast bulk of the prehistoric examples conforms to one of a variety of local patterns. These may all be the varied progeny of about seven prototypes described later from the Transvaal and the Vet Marico area.

As the question of copying is important, for the validity of my deductions depends upon it, we can study the subject shortly. It is to be understood that I here use the terms "copied" and "selected" to carry the same general significance.

So far as one can judge it would seem easier for the untrained eye to assess the relative proportions of two subspherical objects, and their relative diameters, than to estimate relative volume. In actual practice the assessment of relative weight can be very accurate too, provided that the specific gravity of two objects is reasonably similar. However this may be, two facts are strikingly brought out by the plotting of our figures on graph paper.

i. The Bantu Series shows a wide and apparently haphazard scatter, suggesting that (provided there was sufficient weight for the purpose) neither proportions nor dimensions were very important.

ii. The Prehistoric Series, in contrast, shows well-defined grouping, sufficiently distinct in most areas to prove that certain proportions and sizes were achieved by processes of selection of natural stones,

or of copying an acceptable size by reducing a selected natural stone by pecking.

The Bantu Series therefore raises no new problem, but the Prehistoric material does. The first is the problem of copying. How were the stones selected or copied? I have seen a Transvaal Bantu select stones of equal size from a river gravel by comparing the size of one stone directly with the cast left by another in the mud. The result was the choice of a series of large pebbles or boulders none of which varied more than an inch in diameter, about the range of error found in the Prehistoric Series. It is therefore obviously possible for that degree of accuracy to be obtained by simple means. In smaller examples judgment by eye would be more exact, but peculiarly enough the range of error in small examples appears to be much the same as that in the larger.

It is obvious that there are two types of copying:

1. Parallel copying, where several copies are made from one original. In this type the average dimensions of all copies approximate to those of the original.

2. Serial copying, where a copy is made from an original, a second copy made from the first, and so on. There may be a cumulative error here, though this would in part be cancelled and corrected by the chances of subsequent copying.

If we combine these two types of selection or copying, and make two first copies from a single original, then make copies from these two independently, we may get two graphical groups, each slightly different in their graphical scatter. We can regard these as linked groups. Curiously, this third graphical pattern is the most usual, and can be observed in almost any area in South Africa. This may be called "divergent copying."

Deviations from the original may be stopped or controlled by tradition, and tend to approach more closely to the original once divergence is recognized. This stabilizes a "fashion" in shape and proportions, probably as exact as those that govern the proportion of brim to crown in our own choice of a hat in any year, and analogous with our estimations of sizes in footballs and cricket balls, etc.

In some cases the doubled or linked products of divergent copying are sufficiently close for us to ignore the difference, and to unite two clusters under a single average. In other cases, there is such a distinct line of demarcation that it has been thought more satisfactory to keep the two clusters separate and treat them as linked. This necessarily leads to anomalies in comparisons between types. It

therefore becomes essential in such cases to draw deductions in one area, and re-apply them in the next.

These linked or twinned clusters may vary in diameter, and remain constant in height; but this is not always true, and in the Vet-Marico River area we get averages (11·1 × 8·7 cm. and 10·9 × 7·3 cm.) that show a similar diameter and variable height.

Peculiarities of this sort appear to be the rule rather than the exception in the middle ranges of types, and it is difficult to know just how they should be dealt with. The problem becomes more difficult in focal areas where types are abundant. It becomes essential, before any area is understood, to plot the position of each specimen in that area on a piece of centimetre graph paper. The next essential is to plot the specimens from each of the adjacent areas on separate graph papers. Only the two dimensions, diameter and height, need be used. Suitable adjustments of averages should then be made for the local area, so that direct comparison becomes more easy and more exact. Unhappily the publication of a series of graphs of this nature would be too expensive, and only a few are published as examples. Should any worker desire to develop this work further, either locally or generally, the figures are given, and graphs can quickly be built up from these. This is essential before local applications of the present work can be completely understood.

In the section containing the accumulated material, the local graphical clusters are represented by averages. Where only one or two examples represent a cluster, the average is given in brackets. Where more examples are known, there is no bracket.

Aberrant Forms.

Aberrant forms are here divided into two groups:

Erratics that have wandered in from surrounding areas; and
Anomalous, those that fit in with no local distribution.

These latter may be the product of individual variation on the part of the maker, as, for instance, the prolate examples that constantly crop up, presumably the result of local competition and emulation.

The ever-present factor of wrong location must be remembered. For instance, a specimen shown to me at Cape Town eventually proved to have come from the Klerksdorp district, almost 1000 miles away. Such extreme instances are rare, but they exist. J. M. Bain and Dr. Kannemeyer appear to be sinners in this respect. Both early collectors presented batches of implements collected over a series of

years to the South African Museum, and in many instances a wrong allocation is almost certain. Kannemeyer, for instance, was known to have collected numbers of stones, from sites near Smithfield, Burghersdorp, and elsewhere, to have secreted these in the houses of friends, and finally to have sent them in bulk to the South African Museum. Museums are not without blame in this respect.

How to Use the Present Survey.

Results achieved here can only be tentative. Our knowledge of any subject only leads us to a better digestion of further material. By supplying some attempt at a framework on which local workers may build, I hope to evoke additional knowledge from them. This publication is out-of-date immediately the manuscript leaves my hands. It should be the intention of local workers, now that this raw material has been published, to get a more accurate knowledge of local types. There are various problems that can only be dealt with adequately by local workers, and we can discuss a few of these here.

1. The isolation of types of bored stone. This is here dealt with by fitting the main dimensions of each stone to a simple graph and observing the scatter. One or two examples are given to illustrate method.

2. The isolation of areas of distribution of types. This has been attempted here so far as my present knowledge permits, but much remains to be done in the future. The term "area" is here used to cover the approximation of a graphical dispersal to a natural or environmental region, *e.g.* a river bed, a type of veld, an altitude, etc. Finer adjustment of type to natural region should be possible locally, and an extension and more exact definition of an area should result. Remeasurement of available material may help us in this.

3. A full analysis of associable finds. The material should be related to implement types, paintings, engravings, presence or absence of pottery, shell midden, fishbones, stratification, skeletons, and any other suitable elements of culture. Implement types should be related to bored stone types wherever possible. Negative association is important.

4. Extension of knowledge from the particular to the more general. Once types have been isolated, local areas defined and associations studied, this whole complex can be extended into surrounding areas, from simple areas to areas of overlap (focal areas). Work should be from the simple to the more complicated.

This principle of extending our knowledge from the simpler to the more complicated is fundamental. So far the tendency has been all in the other direction. Areas of abundance, such as the Free State, Knysna, and the Cape, have been blindly worked, and various collections made by inexperienced workers, all seeking the same types of evidence: bored stones, grind-stones, human skeletal remains, pottery, and one or two easily recognizable stone implement types. Collections of this haphazard type are often marked "Free State", "Cape Colony", "Natal", or "Northern Transvaal". Even beads and microliths are missed in many instances, so that our most indefatigable workers have in the past done by far the most harm. The minimum of exact evidence that should be given with a collection is the registered farm name (or map reference) and the district or nearest town. If possible museums should ask for every available detail of the discovery of each specimen, and record it in writing.

In certain instances, in spite of this lack of very exact evidence, it can be shown that the number of types of bored stone in a definable area is strictly limited. This is observable in the Vet-Marico area, for instance, and can be abundantly shown elsewhere. In other cases a single type will cut across two or three defined areas and show an independent distribution; an example of this is seen in the Natal coastal belt and along our southern coast, where it is difficult to find very precise limits to areas without subdividing them further than our knowledge of exact provenance permits. This subdivision is suggested for the Knysna-Tzitzikamma area, where forest, mountain, and midden types may be discerned. Only further more detailed evidence of the exact source of each example will prove or disprove this.

If we show that certain types have a limited and definable distribution, then we have shown that the types exist, and that we are not dealing with a chance distribution. It is important to recognize the validity of this hypothesis, as, if we plot the size and shape of all specimens from all areas in South Africa, we find that we are dealing with what appears to be a purely chance distribution. Once the examples are broken down into areas, the picture is very different. Granted that we have "pure areas," such as the Swartland and Grootrivier, it is obvious that deductions made in such areas should be reapplied where a large variety of types exists. Logically we cannot proceed in the opposite direction.

Those areas in which a great variety occurs we can call "focal" areas or areas of overlap. These are areas particularly attractive to

hunting and collecting peoples, and highways of slow migration. They tend to be secondary cultural centres of settlement and consolidation from whence new migrations will originate. We are therefore dealing with a more complex problem here; we are studying numerous overlapping types, the products of successive migrations or periods of sojourn, or even of serial copying. Some of these can be related to the products of people outside the area, and are described as erratic.

For these reasons comparison should constantly be made to parallels from adjacent areas. In actual fact we might divide South Africa into three general types of area: focal areas, migrational routes, and marginal (or pure) areas where few people came. This underlying division is basic. No one is directly interested in the distribution of types; it is the deduction concerning man's story and environment that is of interest.

It might be argued that in those areas where large numbers of specimens happen to have been collected, large numbers of types occur, and that the number of types is in direct proportion to the number of specimens that present-day man has collected. In fact this is not true. The number of specimens collected has every appearance of being generally proportional to the original population, and to the numbers of specimens available. The number of types may therefore be regarded as related to the number of uses, and to the number of cultural groups represented in the area over a period of time, which would partly be a function of environment.

I refer elsewhere to the varied needs that this "bored stone" would meet. No single cultural group felt all those needs. One group might need only a digging-stone, another might add the need for a knobkerry, another might use a dagga-pipe, and so on. We may therefore deduce that the number of types represented is a product of the number of cultural groups present in an area over a period of time, multiplied by the number of uses to which this general form could be put by each group. In other words, where prehistoric density was highest, and migration most frequent, the greatest number of types will occur, and be available for collection.

Region and Area.

In the Preliminary Survey the Union was divided into regions and subdivided into areas. This arrangement will be generally adhered to here, but with certain changes. Regions will receive Roman capital numbers; areas will be referred to by two, three, or four initials; types within an area by the use of small Roman figures.

One further difficulty arises: region and area in the Elongated Series are coincident. Presumably the distribution of types is different, but the number of examples known at present does not permit us to make even this deduction with complete certainty. Here regions are given initial letters, differing from those used for the Circular Series unless the regions themselves coincide.

The region and the area are concepts based upon both distribution and environment. In dealing with distribution it has seldom been found possible to confine a single type to a single area. In some instances types overlap areas, in others they may be confined to smaller distributions within an area. This concept of a static area is therefore a compromise. The second element in this compromise consists of the various environmental factors which controlled the movements and sojourns of early man. Here and there small areas have been singled out, showing perhaps three sites. These necessarily need further investigation, but the suggestion here is that they may represent pure types with a limited and local distribution.

The environmental factors entailed will be dealt with later under the headings "Attracters" and "Barriers" (p. 117).

PART II.—PREHISTORIC CIRCULAR SPECIMENS.

Material and Comment.

The present part consists of a complete list of circular specimens made available to me by various individuals and institutions. The material is listed under sites, partly to reduce space, and partly to permit of the wholesale removal of a single site into another area, should future material make this necessary.

The term "site" must be thought of in a very wide sense. In almost all cases no site proper is given. In over half the specimens only the district is known. The district may either be taken from the name of the nearest town, or may agree with the administrative districts of the Union. There is, for instance, no Koffiefontein district in official publications. It will therefore be realised that a dozen different collections of implements submitted to an institution as from "Koffiefontein" might come from a dozen true sites within a ten- or twenty-mile radius of that village. Where administrative districts are cited the position is no better.

I have therefore made it a general rule to refrain from splitting collections of implements presented at one time as having come from

a single provenance. Where two collections, generally by different donors, given at different times or to different institutions, are marked only by provenance I have had no compunction in dividing them and, where necessary, placing material into two different areas or even regions. The rule is not absolute, but has been infringed in two or three instances at most.

Wherever the letters A, B, etc., are employed after a place-name material has been split into presumed sites. The result will best be seen by turning to Koffiefontein A and B series. It may be seen also at Rustenburg, Lichtenburg, Bloemhof, etc. The administrative districts covered by these last three names include 9020, 4295, and 840 square miles respectively. The area of Wales is 7360 square miles. Other figures are given under the Free State Focal Region.

Overleaf is a schematic geographical representation, summarising all the regions and areas discussed. The regions are numbered in Roman figures in the order of their treatment. (See next page.)

List of Sources.

In the following list I have added the names of persons who have helped me in the collection or measurement of material, or by allowing me access to the material at their disposal. I wish to record my most grateful thanks for the very great help that these persons and institutions have given me. I am no less grateful to those who have sent material to me, either at the South African Museum, or at the University of Cape Town. Those who have been of most help have been mentioned in the text under their own areas.

AMG = Albany Museum, Grahamstown, and Mr. F. Midgley.
ASJ = Archaeological Survey, Johannesburg, Mr. B. D. Malan and Miss J. Haughton.
DC = Prof. M. R. Drennan, Department of Anatomy, University of Cape Town.
ELM = East London Museum, and Miss Courtney-Latimer.
HAC = Harger Archaeological Collection, including material from the old Chamber of Mines Geological Collection, Dr. H. S. Harger and acting curator.
HC = Dr. C. H. T. D. Heese's collection, Alt Stadt, Riversdale.
MFH = Dr. Mossop's collection at Fish Hoek.
MMK = McGregor Museum, Kimberley, and Mr. B. D. Malan.
MW = Mr. Frans Malan's collection, Groenberg, Wellington.
NMP = Natal Museum, Pietermaritzburg, Dr. R. Lawrence and assistant.
PEM = Port Elizabeth Museum, and Miss Hoekstra.
SAM = South African Museum, Cape Town.
SI = Stone Implement Collection, Durban Museum and Art Gallery, and Mr. E. C. Chubb.
SR = Southern Rhodesia Museum, Bulawayo, and Mr. Neville Jones.
TMP = Transvaal Museum, Pretoria, and Miss J. Haughton.
UCT = University of Cape Town, Archaeological Collection.
WUA = Witwatersrand University, Department of Anatomy, and Dr. L. H. Wells.

SCHEMA.*

I. TRANSVAAL.
Eastern.
Central.
Southern.

II. NATAL.
Highlands.
Lowlands.

III. VAAL.
Schoonspruit-Vaal.
Vet-Marico Rivers.
Bloemfontein-Sepani.
Vaal-Harts.

IV. FREE STATE.
Koffiefontein A and B.
Central Free State.
Alexandersfontein.
Modder-Fauresmith.
South-East Free State.

IIIA. VAAL (LOWER).
Middle Vaal. ←→
Lower Vaal.

V. WESTERN BYPASS.
Molopo-Groenwater.
Upington-Hartbees.
Bokkeveld.

VII. SOUTH-EAST.
Upper Thornveld.
Lower Thornveld.
North and South Transkei.

VI. THIRSTLAND.
Kaaienveld.
Namaqualand.
Winterveld.
Trekveld.
Nieuveld-Goup.

VIII. LOWLANDS.
East London.
Bushman's River.
Port Elizabeth.
Zuney-Maitland Mines.

IX. SOUTH COAST.
Sundays River.
Grootrivier.
Tzitzikamma Caves.
Knysna-Tzitzikamma.
Swartberg.
Belvedere-Heidelberg.
Gouritz-Karoo.

XI. CAPE OF GOOD HOPE.
Hinterland.
Cape Flats.
Cape Middens.
Sandveld.
Swartland.

X. AGULHAS.
West Langeberg.
Breederivier.
Bot River.

* Detailed maps follow this section (pp. 109 *et seq.*).

I. THE TRANSVAAL REGION.

The northern boundary of the known distribution of circular bored stones runs from the Dwarsberg and Witfonteinberg along the Hoekberg. From here it passes northward towards the Blaauwberg, eastward to Klein Letaba, then southward to include Barberton and Swaziland. The Transvaal region includes most of the province itself and a few sites in the north-eastern Free State. The northern

boundary coincides with the limits given above. From Swaziland the southern boundary runs south-west to Harrismith, and then includes the Wilge River basin and the Upper Vaal as far as Klerksdorp. In the Wilge River section it overlaps the Natal Highlands region, and part of the eastward extension of the Vet-Marico area.

The distribution of known material is not continuous. It starts at 23° 50′ south, but no examples are known from the Limpopo and few from the Olifants River basin. Prehistoric specimens are more limited in this direction than the later Bantu examples, to be dealt with in a subsequent part (Part V, p. 170).

There seems little reason to believe that the bored stone was Bantu in origin, or that it was taken over and spread farther south by the Bushmen. The evidence at Djebel Redeyef * and other North African sites points to an immediately post-Capsian dating there, and shows "Intercapsioneolithic" associations, which would here be regarded as broadly Wilton. With similar associations at the two extremes of the continent, it is probable that the Wilton peoples were everywhere familiar with the bored stone, at least in certain phases of that culture. The important question for the future to decide is whether the term Wilton is more closely associable with the people we call Hottentots, or with the Bushmen. Evidence on this point is not yet convincing, though the association of Schofield's "Hottentot" pottery with the Wilton is important.

I regard the Transvaal as the primary area of distribution of all our South African prehistoric types, and this might well be called the Prototype Area, so far as the Union is concerned. The Free State region, immediately north of the Orange River, provides a secondary area of distribution to the Cape Province, a Deuterotype or Focal region. This concept will be developed further in dealing with the migrations.

The literature on the Transvaal is extremely meagre, and more has been written on the Bantu material than on the Prehistoric. The notes I have on associations are of little value except for the Vaal. It is hoped that future material (especially that found in the vast districts of the northern and western Transvaal) will be more accurately documented.

ET. Eastern Transvaal Area.

This area is marked by few types; an area where absences are more important than diversity. Our evidence so far is meagre, and the

* E. Gobert, L'Anthropologie, xxiii, 1912, pp. 151 *et seq.*

first and second types listed below are separated in the light of analogous material in other parts of the Transvaal region.

* Type	Diam.	Ht.	Index	Cube	Affinities
i.	(12·3	8·6	70·0	1070)	CT. ii, NH. iii.
ii.	(10·5	8·0	76·2	880)	CT. iv, VMR. iii.
iii.	10·2	5·9	57·8	615	
iv.	(10·7	4·6	43·0	525)	CT. vii.

There seems to be no relationship with the Southern Transvaal. Ermelo and Lake Chrissie suggest a close relationship with the CT. ii and iii. The area shows only specimens of 10·0 cm. and over in diameter. The final specimen listed below (Eastern Transvaal) suggests, by its size and type, the Ermelo area.

* Source	Diam.	Ht.	Index	Cube	Bore		Notes and refs.
BELFAST.							
TMP 1861 .	10·2	6·3	60·8	645	2·7	1·3	
MALELANE.							
TMP 8488 .	11·1	8·3	74·8	1025	5·3	3·1	
BARBERTON.							
SAM 3022 .	10·3	5·9	57·2	625	3·0	1·6	
TMP 1912/12	10·2	4·3	42·1	450	4·1	2·4	Found in chance association with Bantu specimen, in Kaap R. wash.
JAKSLUST.							
TMP 8040 .	10·2	5·6	54·9	585	3·8	3·3	
LAKE CHRISSIE.							
SAM 1733 .	10·0	7·6	76·0	760	4·3	3·5	
SCHAGEN, NELSPRUIT.							
WUA 1085 G.	11·2	5·1	45·5	740	4·3	1·8	Indeterminate basic igneous rock.
ERMELO.							
SAM 3183 .	12·3	8·0	65·0	1210	3·0	1·6	
EZULWENI.							
SI 6 . .	11·2	4·9	43·7	615	3·1	2·8	
"EASTERN TRANSVAAL."							
SAM 3 . .	12·3	9·2	74·8	1405	3·1	3·0	Cylindrical bore.

CT. CENTRAL TRANSVAAL (PROTOTYPE AREA).

I deal with the Eastern Transvaal first, as it appears to stand apart, and to represent the eastward distribution of a limited number of types (fig. 2). The types from the Central Transvaal agree with the Eastern Transvaal series, but additional types are present, thus showing the ET. area to be an area of absences, derived from CT.

* See pp. 13 and 14 for definitions of terms used above columns.

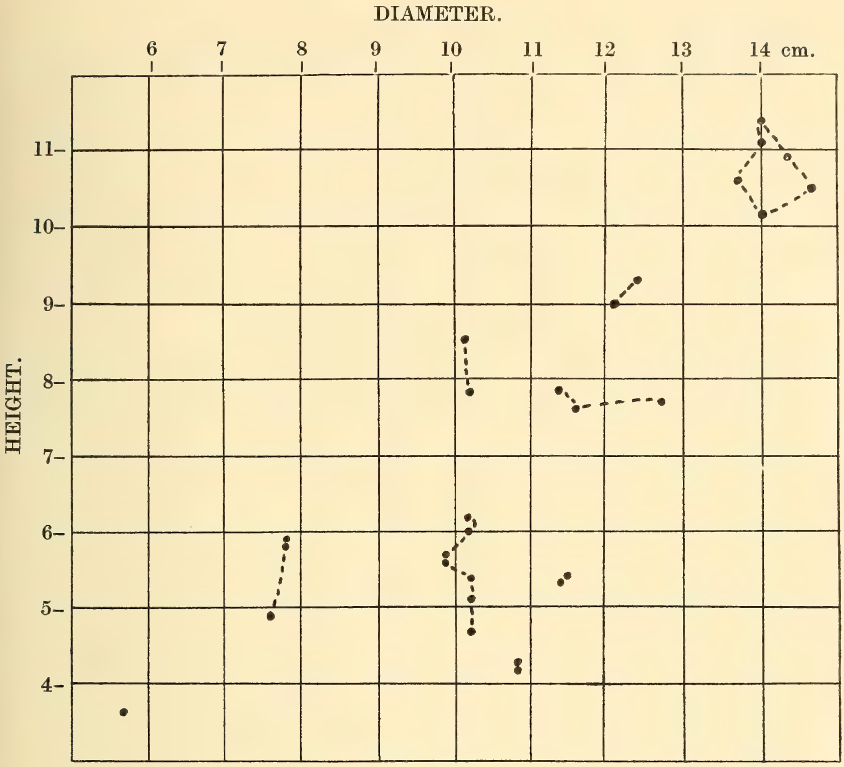


FIG. 2.—Central Transvaal.

On the other side the CT. shows some affinity with the Molopo-Groenwater stretch of the Western Bypass. The term "Prototype Area" will explain itself when the part on Migrations is reached.

i.	14·1	10·8	76·6	2150	MG. i.
ii.	(12·2	9·2	75·4	1370)	ET. i.
iii.	11·7	7·8	66·7	970	VMR. i, MG. ii.
iv.	(10·2	8·2	80·4	865)	ET. ii.
v.	(11·5	5·4	47·0	715)	
vi.	10·0	5·4	54·0	540	NH. v.
vii.	(10·8	4·2	38·9	490)	ET. iv, MG. iv.
viii.	7·7	5·6	72·7	330	MG. v.
ix.	(5·7	3·6	63·2	117)	ST. iii, VH. vi.

As might be expected the Leydsdorp and New Agatha specimens, from sites tucked away behind the Olifants River and the Drakensberg and Murchison ranges, diverge slightly from the usual scatter. The Button's Kop example (CT. ix) is obviously an erratic, probably related to the Southern Transvaal.

LEYDSDORP.							
SAM 2824 .	12·7	7·7	60·6	1240	2·9	1·6	Blue micaceous schist.
ASJ 2/38/7 .	7·8	5·8	74·3	365	3·6	2·2	Conical bore.
NEW AGATHA.							
TMP 1447 .	11·4	5·3	58·2	690	3·6	1·4	
"NORTHERN TRANSVAAL" (?PIETERSBURG).							
WUA 250 .	10·8	4·2	38·9	490	4·8	2·4	Anorthosite.
BUTTON'S KOP.							
TMP 5437 .	5·7	3·6	63·2	117	3·8	1·7	Erratic. ST.
MOLSGAT.							
TMP 1496 .	9·8	5·7	58·2	550	3·6	2·9	
POTGIETERSRUST.							
SAM 4706 .	12·4	9·3	75·0	1430	4·4	1·6	Broken.
WARMBATHS.							
TMP 9162 .	7·6	4·9	65·4	285	2·9	2·0	6 feet deep.
PANKOP.							
TMP . .	14·0	11·1	79·3	2180	4·2	1·6	
WITFONTEIN.							
SAM 7529 .	10·8	4·3	40·0	500	3·8	1·9	
RUSTENBURG: A.							
WUA 670 .	12·1	9·0	74·4	1320	5·3	3·1	2·6 kg.
TMP 8491 .	10·2	4·7	46·0	490	4·1	3·6	
GRASMERE, VENTERSDORP.							
ASJ 14/39 .	11·6	7·6	65·5	1025	5·2	3·5	
KROMDRAAI, POTCHEFSTROOM.							
Univ. Stell. .	11·5	5·4	47·0	715	4·7	3·7	
LICHTENBURG: A.							
HHC 1042 .	11·5	8·0	69·6	1060	4·0	3·1	
TMP 8487 .	10·2	7·8	76·5	810	2·7	2·1	
SANNIESHOF, LICHTENBURG.							
ASJ 29/42 .	9·8	5·6	57·2	530	4·0	2·2	Wonderstone.
VAALBOSPUTTE, LICHTENBURG.							
WUA 1240 .	7·7	5·9	76·9	350	2·2	1·7	·45 kg.
HEBRON.							
TMP 7548 .	14·0	10·2	72·9	2000	3·8	1·9	
WONDERBOOM.							
TMP 8509 .	10·2	5·4	52·9	560	2·7	1·7	
PRETORIA.							
TMP 7560 .	14·6	10·5	71·4	2240	3·9	1·6	
3670 .	14·0	11·4	81·4	2235	3·8	1·3	
1879 .	10·2	8·5	83·3	885	3·6	1·3	
1469 .	10·2	5·1	50·0	530	3·9	2·3	

KENSINGTON, JOHANNESBURG.							
WUA 67/1 .	10·2	6·0	58·8	610	4·2	2·7	·88 kg., 12 feet deep. Serpentine.
EERSTEFABRIEKEN.							
TMP 1876 .	11·4	7·8	68·4	1015	4·7	4·1	
BETHAL.							
Univ. Stell. .	13·7	10·6	77·4	1990	5·5	4·1	
TMP 5187 .	10·2	6·2	60·8	645	2·7	1·2	
HARRISMITH: A.							
ASJ 14/40 .	14·3	10·9	76·2	2230	4·2	2·4	

ST. SOUTHERN TRANSVAAL AREA.

While there are a number of specimens from here, there are relatively few types (fig. 3). Type iv is an erratic.

i.	12·7	10·2	80·3	1645	NH. ii.
ii.	8·8	5·2	59·1	405	NH. v.
iii.	6·5	4·2	64·6	178	NH. vi, CT. ix.
iv.	(7·5	2·6	34·1	145)	

An example included here in group iii (Johannesburg, 7·6 × 3·9) is an erratic. The average, without this specimen, would read 6·0 × 4·2 cm.

RUSTENBURG-BRITS ROAD.							
ASJ 56/40 .	12·7	10·0	78·7	1615	4·6	3·1	
RIETGAT, BRITS.							
UCT 42/ .	13·0	10·5	80·1	1735	3·8	1·2	Hammer.
CYFERBULT.							
TMP 8045 .	8·9	5·9	66·3	470	3·2	2·0	
VENTERSDORP TOWN LANDS.							
HHC 1044 .	12·2	9·6	78·7	1530	4·0	3·5	Diabase or andesite. Smooth.
FREAN'S MILL, VENTERSDORP.							
HHC 1058 .	6·5	4·5	69·2	190	1·5	..	Diabase. Hammer.
POTCHEFSTROOM.							
TMP 8461 .	12·7	9·4	74·0	1515	4·1	2·2	
VEREENIGING.							
Univ. Stell. .	6·9	2·4	34·8	114	2·2	1·9	
SNYDERSDRIFT.							
MMK 44 .	13·2	11·4	86·3	1985	4·5	2·5	Pyriform.
ASVOELSKOP, JOHANNESBURG.							
ASJ 47/37 .	8·5	4·7	55·3	340	3·4	2·5	Soapstone.
22/35A .	7·6	3·9	51·3	225	2·5	1·8	Erratic. SSV.
MAGALIESBERG.							
TMP 1848 .	5·7	4·2	73·5	136	3·5	1·3	

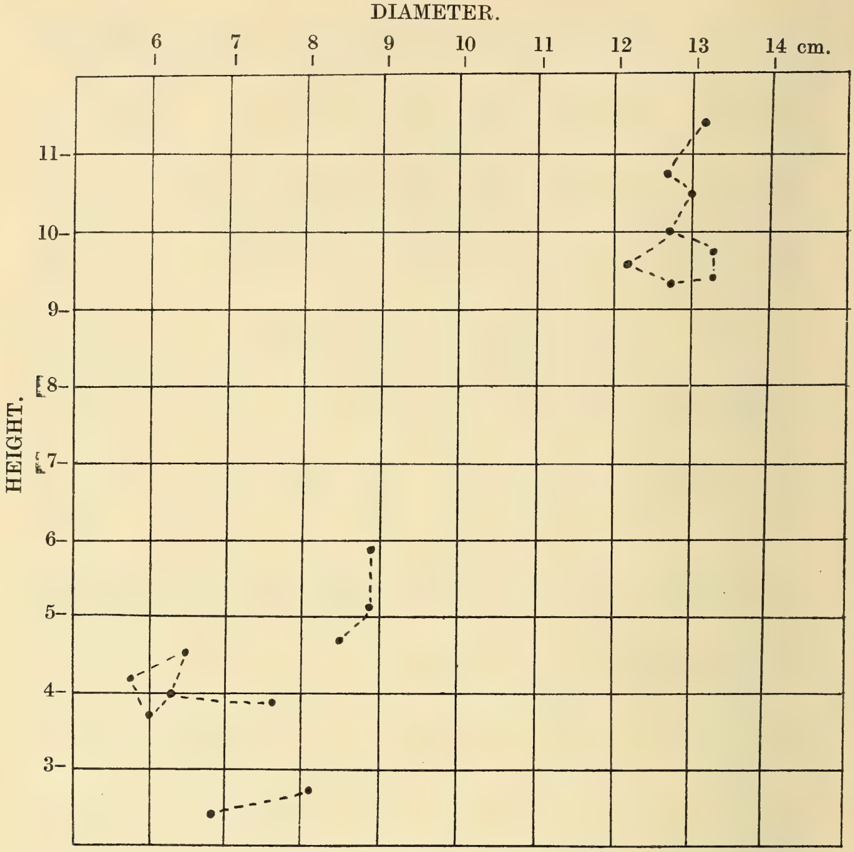


FIG. 3.—Southern Transvaal.

ELOFF'S CUTTING, PRETORIA.							
TMP 8038 .	13·3	9·7	73·0	1705	5·3	3·1	L.S.A. Associations.
BRONKHORSTSPRUIT.							
TMP 1469 .	12·7	10·8	85·0	1740	4·2	2·7	16 feet deep in alluvium, in ashes.
GERMISTON.							
HHC 1253 .	6·3	4·0	63·5	159	2·0	1·1	Found in spruit.
SPRINGS.							
TMP 2333 .	8·9	5·1	57·3	405	3·5	2·3	
BARNARD'S KOP, HEIDELBERG.							
WUA 776 .	8·1	2·7	33·3	177	2·7	1·7	·24 kg. Serpentine.
GRAP, PETRUS STEYN.							
SAM 5025 .	6·0	3·7	61·7	135	2·8	2·5	Smooth polished serpentine. Ploughed up.
STANDERTON: A.							
MMK 1157 .	13·3	(9·4)	67·7	1665	4·2	2·8	SS. Damaged.

Those interested in the Free State should turn to the Vaal Region from here (p. 35). If the Western Province of the Cape is of interest, turn to the Western Bypass (p. 60) and Thirstland Regions (p. 64).

II. NATAL REGION.

This appears to be a *cul-de-sac* with little relationship to areas to the south or west. The main affinities are with the Central, Eastern, and Southern Transvaal areas. Only one affinity exists with the Free State (Bloemfontein-Sepani i.), and that is cut off from Natal by the Basutoland mountains and by the Vet-Marico area.

The Natal Region starts in the south-eastern Transvaal at Standerton, then follows the Klip River to Vrede. From here the distribution so far known coincides with Natal proper, Southern Zululand, and a very small part of Griqualand East.

The region is divided into two areas—the Natal Highlands, and the Natal Lowlands. The latter is the more limited, lying generally below 2800 feet above sea-level (900 m.), running inland with the low Mooi and Tugela valleys until that altitude is reached. The Highland area seems generally restricted to levels above 2500 feet (800 m.), but a stone from Tinley Manor, an anomalous example from Durban, and three normal specimens from there suggest that the limit is not everywhere related to altitude.

The Lowland types conform to a limited extent to the Strandveld or coastal strip, and may prove to be related to a coastal people. This would suggest that both areas were held by different cultural groups at the same time, and that each was sufficiently strong to hold back the other except where the Umgeni and Tugela valleys provided easy access to the coast.

Certain of the Highland types are associable with Smithfield N. elements, and a later survey of migrational routes will show that those feeding Natal diverge from those leading to the Free State, north of the Vaal River. There is thus reason to suppose that my original hypothesis, relating the Smithfield N. series to Rhodesian origins, is remarkably supported (though not proved) by this new evidence.*

NH. Natal Highlands.

i.	(11·0	12·2	111·0	1475)	Anomalous.
ii.	12·1	10·5	86·8	1535	ST. i.
iii.	12·6	8·2	65·1	1300	ET. i, BS. i.
iv.	9·1	6·9	75·8	570	Scattered group. SSV. ii and iii.
v.	9·5	5·3	56·9	480	ST. ii, CT. vi.
vi.	7·0	3·6	51·4	176	ST. iii.

* Goodwin, Proc. Rhod. Sci. Ass., xxxiv, 1934.

STANDERTON B.							
WUA 1037 .	11·6	10·4	90·0	1400	4·5	2·7	1·9 kg. Indurated shale.
VREDE.							
TMP 7352 .	7·0	3·8	54·3	186	3·5	2·5	
MOOIHOEK, UTRECHT.							
WUA 1266 .	12·0	8·0	66·7	1150	4·3	3·0	Ss.
ACTON HOMES.							
SI 10 . .	13·4	8·4	62·7	1510	4·2	3·5	Paintings.
BERGVILLE.							
PEM — .	6·5	4·5	69·2	190	3·5	2·0	
ESTCOURT.							
SI 11 . .	12·9	10·9	84·3	1815	5·6	3·7	
BERGVLIET, ENNERSDALE.							
Q. E. Carter .	10·2	7·0	68·6	730	2·6	1·3	
	12·7	8·2	64·5	1325	4·4	2·6	
YORK.							
NMP 2515 .	10·0	7·0	70·0	700	4·3	1·8	1·06 kg.
BALGOWAN.							
ASJ 32/35 .	8·8	(6·5)	73·8	505	4·6	2·8	All associated with Smithfield N. implements.
	9·5	(5·5)	57·9	495	3·5	2·3	
	7·9	7·2	90·1	450	3·4	2·1	
TINLEY MANOR, STANGER.							
A. G. Wills 5 .	13·2	7·6	57·6	1325	4·1	..	Gritty Ss.
DURBAN.							
ASJ 24/139 .	11·0	12·2	111·0	1475	5·6	5·0	Anomalous.
SI 5 . .	13·1	7·3	55·7	1255	4·0	3·6	
3 . .	12·0	8·2	68·3	1180	4·9	2·2	Roughly triangular.
23 . .	10·4	5·6	53·8	585	3·5	2·3	
UNDERBERG.							
SI 9 . .	6·5	3·2	49·2	136	3·2	1·6	
KOKSTAD.							
SAM 4756 .	9·6	5·7	59·4	525	4·2	3·0	
CEDARVILLE.							
SI 22 . .	7·7	3·9	50·7	231	3·1	2·0	
MATATIELE.							
UCT 34/20 .	8·9	4·7	52·8	370	3·8	2·9	Smithfield N. association.
MACLEAR.							
ELM — .	12·5	9·0	72·0	1405	4·2	2·7	
"NATAL."							
NMP 99 .	11·7	10·2	87·1	1400	4·8	2·8	2·65 kg.

The route to the Natal Highlands is discussed fully under Migrational Routes.

References.

Not much has been written on the Natal Highlands. P. J. Kloppers * describes and illustrates a bored stone from the farm Kalkkrans, Utrecht. It is irregularly quadrilateral in form, and obviously has a low index. No indication whatsoever is given of the size. Kloppers suggests that it may have been used as an axe (? adze) or a hoe. This is highly possible, but the illustration suggests a type very like Trevor's Bantu examples from Pietersburg (p. 183).

NL. Natal Lowlands.

This series shows little relationship to any upcountry material. The only similarity is the chance analogy between shale discs from the South-Western Transvaal and discs from here. In the case of the Transvaal specimens we are obviously dealing with the anomalous local products of shale, and little value can reasonably be attached to the similarity. Only one cluster from the Lowlands area is satisfactory. The low index is the most regular feature, usually below 40 per cent.

i.	(14·6	5·4	37·0	. .)	PE. iii.
ii.	(12·2	4·7	39·3	. .)	EL. ii.
iii.	12·5	2·0	16·0	. .	
iv.	(8·7	3·2	36·8	. .)	
v.	(7·9	1·0	12·0	. .)	
vi.	(5·6	2·7	48·2	95)	

All are below 5·5 cm. in height, lower than the East London series, and below the flattest of the Bushman's River material. The two comparisons given above probably have little value.

Nkwaleni.							
NMP — .	12·5	1·5	12·0	. .	5·0	3·9	·34 kg.
Havelock, Tugela Mouth.							
NMP 2521 .	5·6	2·7	48·2	95	2·4	1·7	·19 kg.
Umhloti Beach, Durban North.							
A. G. Wills .	11·2	3·8	33·9	475	4·3	·8	Pebble.
	12·2	1·8	14·8	270	4·8	3·6	Hard black shale.
	10·4	2·0	19·2	215	4·6	. .	,, ,,
	All from same pottery midden site.						
Willow Grange, Weenen.							
SI 1 . .	14·6	5·4	37·0	. .	4·0	3·0	10 feet below surface.
Pietermaritzburg.							
TMP 3199 .	7·9	1·0	12·0	. .	4·9	4·0	Anomalous.

* " 'n Vierkantige Deurboorde Klipwerktuig," S. Afr. J. Sci., 1935, xxxii, pp. 474–475.

RICHMOND.							
NMP 2516	12·2	4·7	39·3	..	4·7	2·2	1·09 kg.
KARRIDENE.							
SI 29	13·7	3·3	24·1	..	5·2	1·9	Described by J. G. Cramb.
	(10·2	2·9	28·5	..	5·6	..)	From Cramb's illustration.
UVONGO.							
SI 7	10·9	1·8	16·5	..	3·4	1·8	10 feet deep.
28	12·9	2·0	15·5	..	4·2	2·6	
HARDING.							
SI 8	8·7	3·2	36·8	..	5·0	2·7	

Considerably more exact evidence from this Lowlands area should yield better graphical grouping, and some clearer knowledge of the associable implement types. Pottery, microlithic implements, bone tools, the presence or absence of seashells should all be carefully noted, and any new evidence sent to the writer or to the nearest museum, or given reasonable publicity in some acceptable form. The Transkei is similarly very badly represented, and evidence from there would be welcomed.

The relationship suggested above, between this area and other coastal areas farther south, is interesting. There would seem to be a flat coastal or lowland type from Natal to East London. The Bushman's River series consists only of specimens over 6·0 cm. thick, and only one specimen has an index below 50 per cent. No example from NL. reaches either figure. This refutes any idea of a "Coastal Type" of bored stone, found exclusively at midden sites along the coast from Natal to the Cape. The truth is far more complicated than that, as the South Coast Region bears out.

Bibliography and References.

Literature on the Natal and Transvaal bored stones is scanty. One or two references may be found in descriptions of sites, but with little interest. Gooch * divided the bored stones he discovered between the Cape and Natal into three groups: (1) the full sized, 5–7 lb., from the Cape to Natal, globular in form, and of any material from quartzite to shale. (2) Small form, 2–3 lb., "angular" like a thick perforated disc. (3) A small form weighing about 2 lb., globular and occurring in many materials, less abundant. He mentions the finding of a ring near Camperdown; it was of indurated shale, and was discovered by

* W. D. Gooch, "Stone Age of South Africa," J. Anthrop. Inst., vol. xi, 1881, pp. 784–788, illus.

Mr. Thresh. He describes the finding of what we here call a bladed disc (apparently his type 2) at a "considerable depth in blown sand, in the Red Hill railway cutting, Victoria County, Natal." George Leith * notes the finding of a bored stone near Pietermaritzburg. Other instances might be mentioned.

A further note is given by J. G. Cramb † in a somewhat unsatisfying paper. He describes a midden site, with decomposed shell-heaps, typical midden chopping tools, etc., without a single suggestion of Smithfield types described or illustrated in the text. He admits that "it is obvious that there is little or no correlation between these implements and those of the known phases of the Smithfield culture." He suggests that the variation described might have originated in a coastal movement, and stresses the dissimilarity between this and the numerous Strandloper shell middens of the Natal and Zululand coasts, where pottery occurs. Differences between Natal midden sites were noted by Gooch in 1881. Cramb's second example, taken from his drawing, is not included in the list of types above, but is listed tentatively under Karridene.

Further Reading.

If primarily interested in the coastal belt, turn on to the South-Eastern and South-East Lowlands Regions, and continue reading from there (pp. 72 and 77).

III. VAAL REGION.

One of the great highways southward from the Transvaal region very naturally passed along the Vaal River valley. As tributary streams entered the main valley they provided lateral lines of movement, either directly across the Vaal, or as feeding routes along which (as in the case of the Harts River) new types were brought to the lower reaches of the great highway. These types joined the slow migrations southward.

I have thought fit to separate the Vaal region from both the Transvaal and the Free State, but all three are intimately interrelated, feeding one another and making the two provinces difficult to understand. Perhaps the key lies in the National Museum, Bloemfontein, but I am unable in the present circumstances to obtain

* J. Roy. Anthrop. Inst., vol. i, 1898.

† "Smithfield Implements from a Natal Coastal Site," Trans. Roy. Soc. S. Afr., 1934, vol. xxii, pp. 205–223.

access to that collection. It is to be hoped that Dr. E. C. N. van Hoepen's forthcoming work on the bored stones will provide data for a clearer view of the position.

The Schoonspruit appears to provide a feeder to the Vaal, with little attempt to transgress the river southward. In contrast the Vet-Marico River area has a double function. While it feeds the Vaal River valley from the headwaters of the Marico, it also cuts directly across the Vaal valley and seems to have peopled the northern half of the Free State. This area is divided into a northern and a southern stretch, but the division has no value apart from the geographical distribution.

The Middle and Lower Vaal areas might be paired as another region, as influences cut across from the Free State focus on the east. I have therefore made them into a subregion, IIIA Vaal Region (Lower), to permit division with further evidence.

SCV. Schoonspruit-Vaal Area.

This area shows little real relationship with surrounding areas, and many of the types seem to be anomalous. I do not regard it as important.

i.	(10·8	8·7	80·5	1015)	VMR. i, LV. iii.
ii.	9·3	7·4	80·0	645	CFS. ii, LV. v.
iii.	(8·1	7·1	87·6	465)	MG. v.
iv.	10·0	3·3	33·0	330	VMR. v.
v.	7·8	4·4	56·4	270	VH. v, MV. xii.
vi.	11·0	1·2	10·0	..	

Rustenburg: B.							
ASJ 49/36/5 .	7·9	3·8	48·1	235	3·3	1·9	
	9·8	2·9	29·6	(280)	1·9	1·8	Disc.
Lichtenburg: B.							
AMG 1760 .	7·3	4·4	60·3	235	3·3	1·9	
ASJ 7/38 .	10·8	·8	(7·4)	..	5·0	4·8	Flat disc.
	13·0	·9	(7·0)	..	5·0	3·9	Flat disc.
Klerksdorp: A.							
WUA 752 .	9·8	1·3	(13·3)	..	7·0	6·2	Slate disc.
894 .	9·8	2·7	(27·5)	..	3·0	2·4	Ironstone disc.
Slurry, Mafeking.							
MMK 1894 .	7·8	7·3	93·6	445	3·5	2·5	
Sheppard Island.							
ASJ 7/35/67 .	10·9	8·8	80·7	1050	4·0	3·0	Under 2 feet gravel. One face ground.
7/35/7 .	10·6	8·5	80·2	955	5·4	2·4	Under 4 feet gravel.
7/35/68 .	9·1	7·5	82·4	620	3·2	3·0	
7/35/48 .	10·5	3·5	33·3	385	2·9	2·4	
7/35/47 .	7·8	5·0	64·1	305	3·0	2·0	

SEVENFONTEIN, KINGSWOOD.							
MMK 1425 .	8·3	6·9	83·1	475	4·4	3·2	Ss. grinder.
TYGERFONTEIN 189, HOOPSTAD.							
ASJ 8/41 .	9·6	7·3	76·0	675	(2·9	0·5)	Conical bore.
FOURTEEN STREAMS.							
AMG 1352 .	8·9	7·6	85·4	600	3·4	1·8	
TMP 7528 .	10·5	1·6	15·2	..	3·8	3·6	Disc.

Slurry and Sevenfontein show some affinity with the Molopo-Groenwater area (Western Bypass).

VMR. VET-MARICO RIVERS.

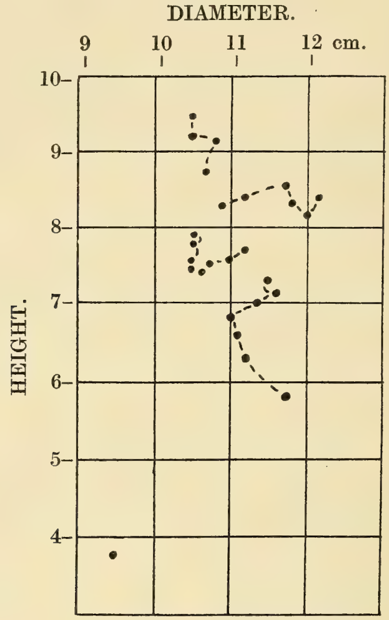
This provides a most important highway from the sources of the Marico River in the Western Transvaal, across the Highveld, to the Vaal. There is some movement along the Vaal, but far more important are the migrations along the Vet, the Valsch, and probably the Rhenoster Rivers, to supply the dominant types in the northern Free State. This area shows some affinities with the Transvaal, and has been divided into a northern and a southern section. The northern section includes the Marico sources, the Highveld, and the upper reaches of the Vaal River as far as the Vaal Harts confluence: the southern is listed from east to west, across the Free State to the junction of the Vet with the Vaal.

i.	11·6	8·4	72·4	1130	CT. iii.
ii.	10·6	9·2	86·8	1035	BS. ii, SCV. i.
iii.	10·7	7·6	71·0	870	CFS. i.
iv.	11·3	6·6	58·4	845	BS. iii.
v.	(9·4	3·7	39·4	330)	SCV. iv.

The most striking fact about the area is the paucity of types in relation to the number of specimens (fig. 4). But just as striking when the examples are plotted on a graph paper, is the very slight variation between groups. Except for the last example (presumably an erratic from the Schoonspruit-Vaal area), diameters range from 10·5 to 12·2 cm., and heights vary between 9·5 and 5·8 cm. The only other area where an analogous type of distribution is discernible is in the Central Free State, to the South, but only one type (VMR. iii and CFS i) agrees. It would seem that we have here the logical outcome of the theory of copying outlined above in Part I (p. 16).

The extraordinarily high proportion of conical bores in the northern part of the area is extremely interesting and may prove important. This will be touched on again when dealing with the Bantu material in Part V. There is reason to believe that most (perhaps all) were

bored with metal tools by Bushmen living in some sort of association with Sotho tribes, possibly as serfs.



TEXT-FIG. 4.—Vet Marico Rivers.

NORTHERN (MARICO-VAAL).

WELBEDACHT.							
SAM 4216 .	10·6	7·4	70·0	830	(3·0	1·4)	Conical bore. Signs of striation part way down.
ZWARTRUGGENS.							
SAM ZW .	12·0	8·2	68·3	1180	(3·0	1·4)	Conical bore.
BULTFONTEIN.							
HHC 1046 .	10·5	9·5	90·4	1050	4·5	2·6	2·1 kg. Specular iron ore. 20 feet deep
KLERKSDORP: B.							
L. M. Earle .	11·0	6·8	61·9	825	(4·0	1·6)	Ss. conical bore.
BLOEMHOF: A.							
MMK 902 .	12·1	8·4	65·1	1230	5·1	2·9	Amygd. diabase.
ASJ 5/35/BS.	11·5	7·3	63·5	965	5·2	4·0	Soapstone.
	11·4	7·0	61·4	910	(4·0	3·6)	Conical bore.
	10·7	7·5	70·9	860	5·0	4·4	Soapstone.
WUA 1038 .	11·7	5·8	50·0	795	2·3	1·7	1·3 kg. Ss.

CHRISTIANIA TOWN LANDS.							
HHC 1045 .	10·9	8·3	76·1	985	4·9	2·9	Diabase or andesite. Top of flood-plain alluvium. Outside smoothed. Used as grinder.
VAN AASWEGENSHOEK, CHRISTIANIA.							
MMK 1845 .	11·2	7·7	68·7	965	4·7	2·6	Dolerite.

This last specimen was found with an *Archidiskodon.* See Dart, S. Afr. J. Sci., vol. xxvi, 1929, p. 715.

SOUTHERN (VET-VAAL).

BAVIAANSKRANZ.							
PEM 614. V .	10·5	7·8	74·2	860	5·9	3·5	
HARRISMITH: B.							
ASJ 7/41 .	10·5	9·2	87·6	1015	4·7	2·2	
	10·7	8·7	81·3	1000	4·5	3·8	
	10·5	7·5	71·4	830	5·2	4·0	
KRANSFONTEIN, HARRISMITH.							
Univ. Stell. .	11·7	8·6	73·5	1175	3·2	2·3	
PARYS.							
MMK 2147 .	11·6	7·1	61·2	955	5·3	4·6	Cyclindrical bore.
KROONSTAD.							
MMK 1299 .	11·2	8·4	75·0	1055	5·5	2·9	Ss.
Univ. Stell. .	11·2	6·3	56·2	790	4·9	3·7	
	9·4	3·7	39·4	330	2·8	2·6	Shale. Erratic from SSV.
WINBURG.							
TMP 6468 .	10·5	7·9	75·2	870	4·1	2·7	
IL PARADISO, BRANDFORT.							
Univ. Stell. .	11·1	6·6	59·5	815	4·5	3·3	Shale. Pecked surface.
NAPIER, BOSHOF.							
MMK 279 .	11·8	8·3	70·0	1155	4·5	2·9	Ventersdorp travertine.
BUTHABUTHA.							
SAM 1758 .	10·5	7·5	71·4	825	4·9	2·5	
NORTHERN BASUTOLAND.							
SAM 466 .	10·8	9·1	84·2	1060	3·8	2·6	Quartzite Ss.
	11·0	7·6	69·0	920	4·4	3·3	Ss. Nodule.

BS. BLOEMFONTEIN-SEPANI AREA.

This area is somewhat detached from the southern Free State, and shows affinities with the Vaal. It is possible that it has affinities with the south-eastern Free State, and that it was the route by which

material passed from the Vaal, along the western side of Basutoland, then up the Orange to the Transkei. More evidence is essential to get this clear. On the other hand the similarity with some of the Winterveld types is abundantly clear.

i.	13·0	8·4	64·6	1420	VH. ii, KA. i, NH. iii, TK. ii.
ii.	(10·5	9·2	87·2	1035)	VMR. ii, UTV. ii.
iii.	(11·7	6·5	55·1	900)	VMR. iv.
iv.	(8·3	8·5	102·4	585)	KA. iii, WV. vi.
v.	(8·8	6·2	70·4	480)	KA. ii, WV. vii, SEFS. vii, UTV. v.
vi.	(5·1	3·8	69·4	108)	KA. v, WV. ix, SEFS. xii, TK. v.

It will be seen that most of the comparisons for the first three types lie to the north, while those from the latter three lie to the south. The Transkei shows affinities with types i and vi. This last is also recognizable in the south-eastern Free State.

Apart from the last type, all specimens exceed 8 cm. in diameter, while most exceed 10·3 cm. It becomes obvious, if we plot this series against the Vet-Marico series, that individual examples from here coincide more nearly with VMR. specimens than the type averages would suggest. One last question needs comment. What is the relationship between type BS. i and the Natal Highlands type iii? The fact that the bulk of the southern distribution of the Vet-Marico River area and the Basutoland massives lie across the road between suggests very strongly that the present area merely represents a divergent branch, originating in a common source to the north, probably ET. i, or CT. iii, both of which show similarities to the Natal Highlands, but less with the present area.

Bloemfontein.						
TMP 1873 .	10·8	9·4	87·9	1095	3·3	2·5
1875 .	12·4	6·7	54·0	1030	6·9	3·3
ASJ — .	8·3	8·5	102·4	585	4·4	..
TMP 1850 .	5·7	4·7	78·9	146	2·9	2·0
Sepani.						
SAM 2474 .	13·5	8·5	62·9	1550	7·5	4·3
	13·5	7·8	57·8	1420	4·6	3·2
	12·1	8·6	71·1	1260	5·3	3·2
	10·4	9·0	86·4	975	4·5	3·2
	11·1	6·3	56·3	775	5·0	3·7
	8·8	6·2	70·4	480	4·1	3·2
	4·9	2·9	59·2	70	2·0	..

The extreme paucity of material from this area is very much regretted. It is possible that the averages given above have some relation to fact, but little real value can be placed upon them until Dr. E. C. N. van Hoepen publishes his work on the bored stones in the National Museum, Bloemfontein.

VH. Vaal-Harts Area.

We are now getting towards the middle reaches of the Vaal. The most striking fact is the preponderance of examples over 11·0 cm. in diameter, with a marked step between these and smaller types—presumably representing a division between the digging-stick stone and the knobkerrie head. The larger elements recall, in a very general way, the VMR. and ST. areas, implying that the types were intended for the same function in all these areas.

i.	13·9	11·0	79·8	2125	MG. i, NWT. i, MV. ii.
ii.	13·0	9·2	70·8	1555	BS. i, ST. i, MV. iv.
iii.	11·4	9·8	85·9	1275	MF. ii.
iv.	13·3	6·8	51·1	1190	
v.	(7·5	3·8	50·6	215)	MV. xiii, SWT. ii, NFS. iv.
vi.	(5·0	3·5	70·0	87)	NWT. viii, BS. vi.

Type ii might reasonably be redivided into two types 13·4 × 8·7 cm. and 12·8 × 9·8 cm. respectively. The former shows similarities with BS. i, the latter with ST. i and MV. iv.

Schweizer Reineke.							
HHC 1043 .	13·0	10·0	77·0	1690	5·0	3·6	Diabase. 3 feet deep on gravels.
TMP 3722 .	12·7	6·7	52·9	1080	4·2	2·2	Harts River gravels.
MMK 993 .	(7·3)	4·1	56·2	218	3·1	2·5	Amygd. diabase. Rolled.
Bloemhof B.							
ASJ 13/41 .	14·5	11·4	78·6	2420	4·9	1·6	
	13·8	11·1	80·4	2115	6·5	3·5	
5/35/85 .	12·0	10·2	85·0	1470	4·2	..	
MMK 1117 .	12·9	8·2	63·6	1365	5·9	3·3	Ss.
ASJ 5/35/85 .	11·0	10·0	90·9	1210	4·6	2·7	Ss.
Leeuwkraal, Hoopstad.							
ASJ 7/35/6 .	13·4	7·5	56·0	1345	5·1	2·7	Surface.
Baberslagte, Hoopstad.							
ASJ 7/35/1 .	13·3	6·9	51·9	1220	4·7	2·9	6 feet deep.
Hoopstad.							
MMK 999 .	14·0	6·2	55·9	1215	4·3	2·5	Ss.
Christiania.							
HHC 1045 .	13·6	9·5	70·0	1755	4·5	3·8	
MMK 1292 .	5·1	3·9	76·5	101	2·9	2·0	Amygd. diabase. Grinder.
Bethelpella.							
ASJ 5/35/BPS	4·8	3·1	64·6	71	2·7	1·2	Surface.
Koopmansfontein.							
MMK 418 .	12·8	10·0	78·1	1640	4·6	2·9	

NEWLANDS.							
MMK 389 .	13·4	10·5	78·4	1860	5·4	3·1	Ss.
,, .	13·4	8·6	64·2	1520	5·0	3·8	Ss.
1249 .	12·5	9·2	73·6	1440	5·1	3·5	Ss.
1132 .	11·2	9·2	82·1	1150	5·0	2·3	Ss.
VAAL-HARTS CONFLUENCE.							
ASJ 4/40/22 .	7·7	3·7	48·0	219	3·2	2·5	

IIIA. VAAL REGION (LOWER).

The Griqualand stretch of the Vall River is marked by a variety of types, some migrants down the Vaal, others cross movements to or from the Free State Focal Area. A more exact knowledge of provenance is essential, especially as to the relation of specimens to the river, left or right bank, etc. At present the picture is somewhat kaleidoscopic.

The region is a subdivision of the Vaal Region, and common types hold the two areas (here called the Middle and the Lower Vaal) into one whole, difficult to disentangle into two true areas. It is obvious too that sites such as Rietpan and Botterhoek present types that show affinity with Smithfield, Postmasburg, and Phillipstown. These widely separated sites will be dealt with under Migrations. The column of comparisons will suggest the interweaving of movements to and from this stretch of the Vaal and surrounding areas.

MV. MIDDLE VAAL.

i.	(14·3	12·2	85·5	2500)	SEFS. i, MG. i, WV. i.
ii.	(13·1	11·4	80·7	1760)	VH. i, ST. i, MF. i.
iii.	11·4	11·6	101·7	1505	LV. i.
iv.	12·5	9·6	76·9	1500	VH. ii, KB. ii, SEFS. iii, CT. ii.
v.	(12·5	8·0	64·4	1260)	BS. i, KA. i, NWT. ii.
vi.	11·5	9·0	78·3	1200	MF. iii.
vii.	10·5	7·9	75·2	870	KB. iv, ET. ii, VMR. iii.
viii.	(12·3	4·6	37·4	700)	Anomalous.
ix.	11·0	5·5	50·0	665	LV. iv, CT. v.
x.	9·3	5·0	53·7	430	AG. i, ST. ii.
xi.	7·8	6·3	87·2	385	LV. vi, KB. vi, MG. v, CFS. iii.
xii.	7·2	4·1	56·9	213	SCV. v, ST. iii, VH. v.
xiii.	6·5	5·0	76·9	210	KA. iv.

While it is obvious that sites from Barkly West to Gong-Gong and at Kimberley show an overlap of MV. and LV. types, these have been included here. Material from Katlani, Rietpan, etc., which would fit better geographically into the Lower Vaal area, have also been included here, as their graphical scatter conforms better. As our exact knowledge of this whole province increases it may be better to work from the geographical distribution of types and develop new areas.

RIVERVIEW ESTATE.							
ASJ 5/35/55 .	11·0	8·2	74·5	990	4·0	2·0	Söhnge, Visser and Lowe. Site VI.
16/40 .	10·0	8·1	81·0	810	4·5	2·7	
WINDSORTON.							
ASJ 15/41 .	11·6	11·3	97·4	1520	5·5	2·9	
	11·6	8·9	78·8	1135	3·8	2·8	
SAM 1839 .	12·3	4·6	37·4	700	3·2	3·0	Cylindrical bore. Anomalous.
ASJ 15/41/19 W.	10·8	5·7	52·8	665	4·6	2·3	
SAM 1839 .	7·0	5·3	75·7	260	3·2	1·5	
SLYPKLIP, WINDSORTON.							
ASJ 20/43 .	9·6	8·3	86·4	765	3·3	2·6	Ss.
RIVERTON.							
ASJ 36/32/16	12·5	(9·5)	79·6	1485	4·5	3·8	
MMK 1294 .	11·8	9·2	82·1	1280	5·2	2·7	Ss.
	8·0	6·2	77·5	400	2·4	1·4	Ss.
GOOD HOPE, PNIEL.							
MMK 1488 .	11·2	10·8	96·4	1355	5·0	2·5	
PNIEL.							
ASJ 61/38 .	11·5	9·0	78·2	1190	5·2	2·7	
5/35 .	6·2	5·7	91·9	220	2·4	1·4	Erratic. *Cf.* UH. v.
KANTEEN KOP.							
ASJ K.K. .	6·5	4·4	67·7	186	2·8	2·5	
WINTER'S RUSH.							
SAM 791 .	8·1	6·6	81·5	435	4·1	2·0	
BARKLY WEST.							
ASJ 22/41 .	13·2	11·6	87·8	2020	5·2	2·9	
UCT 29/7 .	12·5	8·2	65·6	1280	5·9	3·6	
MMK 1492 .	9·8	4·4	44·9	425	4·2	2·1	
WUA 247 .	7·5	(4·5)	60·0	255	2·3	..	
BARKLY WEST TO GONG-GONG.							
Van Alphen .	13·0	9·8	75·4	1655	3·8	..	
	11·5	12·3	107·9	1625	3·8	..	
	11·7	10·2	87·2	1415	4·9	3·2	
	12·4	9·2	74·3	1415	5·4	2·4	
	12·5	7·9	63·2	1240	5·4	4·0	
	10·9	7·4	67·9	880	3·8	2·4	
	8·0	6·5	81·2	415	3·9	2·2	
	7·9	6·4	81·0	400	3·8	2·6	
	6·9	6·4	92·8	305	4·1	1·6	
	6·9	5·1	73·9	245	3·6	1·8	
RIETPAN.							
MMK 607 .	14·5	12·4	85·5	2610	4·5	2·1	Radial cuts at mouth.
260 .	13·0	11·2	86·2	1900	5·6	3·2	
261 .	9·3	5·2	55·9	450	3·3	1·8	Ss.
489 .	9·1	5·0	55·4	415	4·0	2·8	

KIMBERLEY.								
MMK 1879 .	13·1	9·6	73·3	1650	5·3	3·1	Ss.	
1898 .	12·9	9·3	72·1	1550	4·7	2·9	Ss.	
ASJ 4/40/21 .	10·5	7·2	68·5	795	2·5	..		
ASJ 8 . .	11·2	5·5	49·1	690	3·8	2·7		
,, . .	9·4	5·2	55·3	460	3·9	2·7		
MMK 1296 .	8·1	6·1	75·3	400	3·5	1·9	Ss.	Grinder.
,, .	7·6	5·9	77·6	340	3·7	1·9		
ASJ 4/40/21 .	7·4	5·8	78·4	318	3·5	1·4		
MMK 1296 .	6·4	4·7	73·4	192	3·1	1·8	Ss.	
ASJ 8 . .	6·9	3·5	50·7	167	3·0	2·5		
AMG 1732 .	5·8	4·8	82·8	161	2·8	·9		
SKANSKOP, KIMBERLEY.								
MMK 1850 .	8·8	5·1	58·0	400	3·9	3·0		
RIET RIVER, KIMBERLEY.								
SAM — .	10·0	8·5	85·0	850	4·2	3·1		
BOTTERHOEK, JAKOBSDAL.								
MMK 997 .	14·2	12·1	85·2	2440	4·7	2·8		
1180 .	11·0	5·6	51·0	680	5·2	2·6	Ss.	
,, .	6·8	4·7	69·1	217	3·2	2·0	Ss.	
ROOIPOORT.								
ASJ 36/35/15	11·7	9·1	77·8	1245	6·0	2·7		
	10·8	7·9	73·1	920	5·4	2·5		
	8·4	6·2	73·8	440	4·0	2·5		
SCHMIDTSDRIF.								
MMK 733 .	12·3	10·0	81·3	1515	4·3	2·4	Ss.	
SAM 4957 .	10·6	8·4	79·2	945	5·1	2·9		
	7·2	4·1	57·3	210	4·2	2·6		
MIDDELPLAATS.								
MMK 1488 .	10·8	5·2	48·2	605	3·9	2·3	Ss.	
KATLANI, DOUGLAS.								
PEM 614/0 .	11·3	9·0	79·6	1150	5·3	3·4		
MAZELSFONTEIN.								
MMK 1803 .	12·0	9·8	81·7	1410	4·5	3·1		

The fact that certain of these Middle Vaal types recur at Douglas and other sites below the Modder River junction suggests that these are true Vaal types (MV. iii, ix, xi). They conform to LV. i, iv, and vi respectively, confirming the suggestion. The remainder probably represent lateral movements into this valley, generally from the Free State region, but sometimes from the Vaal-Harts, Southern Transvaal, etc., suggesting that these last are also intimately related to the Vaal valley.

LV. LOWER VAAL.

Careful comparison of this area with the Middle Vaal, either geographically or graphically, will at once show that the division is

hardly justifiable at present. Sites in both series occur at Douglas, etc., while types often correspond. There is a difference present, but the MV. series has been used largely as a receptacle for the sites showing mixed types, the number of averages is therefore greater in that series. I suspect that we are dealing with material not from two stretches of the river, but from two banks of the river. The picture is not so simple as that, for at times, especially along the stretch west of Barkly West village, the same types occur on both banks. These two areas must yield, with further and more exact knowledge, to more reasonable adjustment.

i.	(11·6	10·8	93·1	1455)	MV. iii.
ii.	(13·4	6·0	44·8	1080)	VH. iv.
iii.	10·3	9·0	87·3	955	BS. ii, SCV. i.
iv.	(10·7	6·0	56·1	685)	MV. ix.
v.	(9·1	7·5	82·4	620)	KB. v, SCV. iii.
vi.	8·2	5·7	70·0	385	MV. xi, KA. ii.
vii.	(5·9	1·7	28·8	..)	KA. v.

While the MV. series shows the more general distribution, the LV. material is more closely related to the Kaaienveld (p. 65).

GONG-GONG.							
MMK 991 .	6·4	1·6	25·0	66	2·6	2·2	Ss.
DOUGLAS.							
MMK 929 .	13·4	6·0	44·8	1080	5·5	3·3	Ss.
1887 .	9·0	6·3	70·0	510	4·4	2·4	
929 .	8·0	6·2	77·5	400	3·8	2·8	
	7·4	5·6	75·7	305	3·4	1·9	
1666 .	5·3	1·8	34·0	51	2·7	2·5	
ST. CLAIR, DOUGLAS.							
SAM 702 .	11·6	11·0	94·8	1480	4·0	2·9	Ss.
	10·0	8·5	85·0	850	3·9	3·3	
	11·0	6·4	58·2	775	5·2	..	
	9·6	7·7	80·1	710	..	..	Started.
MMK 258 .	10·4	5·5	52·9	595	4·6	3·1	Ss.
SAM 702 .	8·6	7·4	86·0	545	3·5	2·1	
	8·2	6·1	74·4	410	3·7	2·2	
	8·0	5·3	66·2	390	4·5	..	
BROADWATERS, DOUGLAS.							
MMK 2105 .	10·2	9·5	93·0	990	3·4	1·5	Soapstone. Partly rebored later.
WITBOOM, GRIQUATOWN.							
MMK 1291 .	10·8	9·0	83·3	1050	3·8	2·2	
GRANGE.							
MMK 174 .	11·8	10·7	90·7	1490	6·0	3·3	
175 .	8·5	5·3	62·4	385	3·8	2·5	

In the McGregor Museum collection at Kimberley, a few outstanding specimens occur. Some years ago Mr. E. G. Bryant of Prieska

presented the collection with a complete digging-stick. It consists of a large bored stone mounted on a stick, perhaps an inch in diameter and a yard in length; the end of the stick is shod with a buckhorn.

Three specimens from Griqualand West appear to be mace-heads, possibly of a ceremonial nature. They are of hard igneous rock, tooled over the whole surface. One has been tooled to a pyriform shape, markedly pointed at one end; at the opposite pole there is a flat platform, obviously prepared for boring. The remainder are ovals, bored into one face only, presumably to take a suitable stick. (Compare UTV. Aliwal North; type vii, SAM 1361, where the example measuring 6·3 × 6·3 cm. is of analogous pyriform type.)

Illustrations of further Griquatown material can be found in E. J. Dunn's book,* but the material itself is unhappily in Australia and the figures are not available.

IV. FREE STATE FOCAL REGION.

This region has had to be rather awkwardly divided. A short study of the Koffiefontein material will explain quite clearly why this subdivision is necessary. It is due to the paucity of evidence of exact provenance. All material should be referred to the smallest unit of land, viz. a farm. Boshof district covers about 5000 square miles of territory, while Fauresmith district covers a little less. Material marked by districts is therefore as precisely placed as material from Britain marked by counties. Yorkshire with its 6000 square miles compares with many districts in South Africa. Such terms as Smithfield mean little more than this. Compare the areas given in the beginning of this part (Part II, p. 23).

What makes the position even more difficult is that this region is focal. It provides the area of attraction that seems to have concentrated and mingled every movement that passed between the Basutoland massives and the Kaap Plateau, a belt 300 miles wide, representing a bottle-neck of migration between the arid Kalahari and the impassable mountains.

This region consists of the southern half of the Free State, and the basins of the Modder, Riet, Kaffir, and Caledon Rivers, together with the northern basin of the Orange and the junction of the Vaal with the Orange River. At this last point the types seem to coincide with the northernmost distribution of the Trekveld-Winterveld area.

* E. J. Dunn, The Bushmen. London, 1931.

Immediately west of this region lie the Middle and Lower Vaal areas, while to the north are the northern Free State and the Bloemfontein-Sepani areas. To the east the Maluti range of the Drakensberg confines the area absolutely.

As one would expect of a region served by a network of rivers, divided only by low plateau country, and lying on the arid side of the Drakensbergen, these perennial streams (though considerably reduced by the end of the dry winter) have attracted man from all directions. Cultural traits converge on the streams and cross and recross from a number of sources, meeting and mingling, and at times combining to form new cultural patterns. They create a jigsaw of distribution difficult to deal with on a map.

My task has been rendered more difficult in this region, as war conditions and service have prevented me from visiting the McGregor Museum, Kimberley, for the purpose of measuring specimens. The museum itself has been shorthanded and incapable of undertaking the work. For the great quantity of additional material I have received from this source I am indebted to an old student, B. D. Malan (now attached to the Archaeological Survey at Johannesburg), who took advantage of his presence in Kimberley to obtain this valuable information. My earlier notes did not represent a tithe of the material thus made available. I have been dissuaded from making use of material from the National Museum, Bloemfontein, as Dr. E. C. N. van Hoepen tells me he intends to publish this at some future date.

Professor C. van Riet Lowe has shown this region to be the heart of the Smithfield culture, especially of phase B. Indeed to understand this region at all clearly the reader is referred to papers by that author,* while a site list is given later. Several of the sites listed here are described in these papers, and some knowledge of the relationships existing between the various phases of the Smithfield culture, the Wilton, and the bored stone can be gathered from those sources. Other literature will be mentioned as we proceed. This is the focal area of the Smithfield B culture, and most of our examples are associated with this phase.

* Lowe and Cable, "The lithicultural horizon . . . of the bored stone in the Orange Free State," S. Afr. J. Sci., 1927, vol. xxiv, pp. 506–513.

C. van Riet Lowe, "The Smithfield Industry in the Orange Free State," Ann. S. Afr. Mus., 1929, vol. xxvii, pp. 151–234.

Söhnge, Visser, and Lowe, "The Archaeology of the Vaal River Basin," Geological Survey, Mem. 35. Pretoria, 1937.

K.A., K.B. Koffiefontein Area.

The material from this ill-defined area, including parts of the Jakobsdal and Fauresmith districts, presents a very peculiar problem. If all examples are taken together they cover the range of the Free

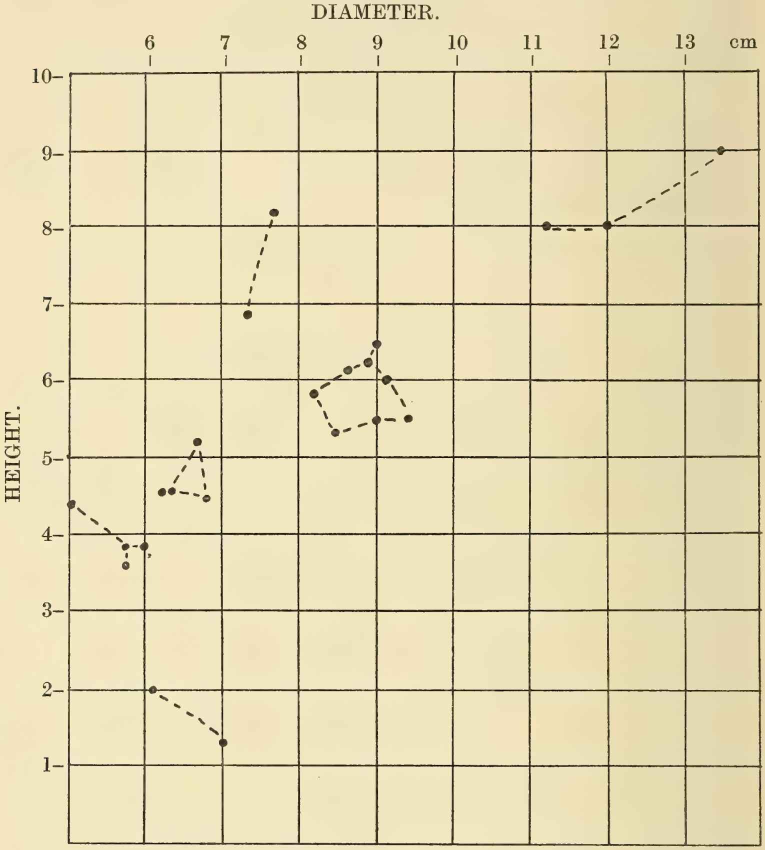


Fig. 5.—Koffiefontein A.

State types fairly comprehensively. If, however, they are divided into two groups, related to the collections made by independent institutions, the picture is very different. The series is therefore arranged in two series, each with its own averages. The first series (K.A.) is from the Archaeological Survey, Johannesburg, and from the University of Cape Town collection only. These are from the same sources, as I collected the latter example with Professor van Riet Lowe from his sites. These are mainly from the Fauresmith

district, on the Koffiefontein town lands and neighbouring farms (fig. 5). The other series (K.B.) consists of material sent in to the McGregor Museum (apparently from the Jakobsdal side of Koffiefontein) and to the Anatomy Department of the University of the Witwatersrand, from comparable sites (fig. 6).

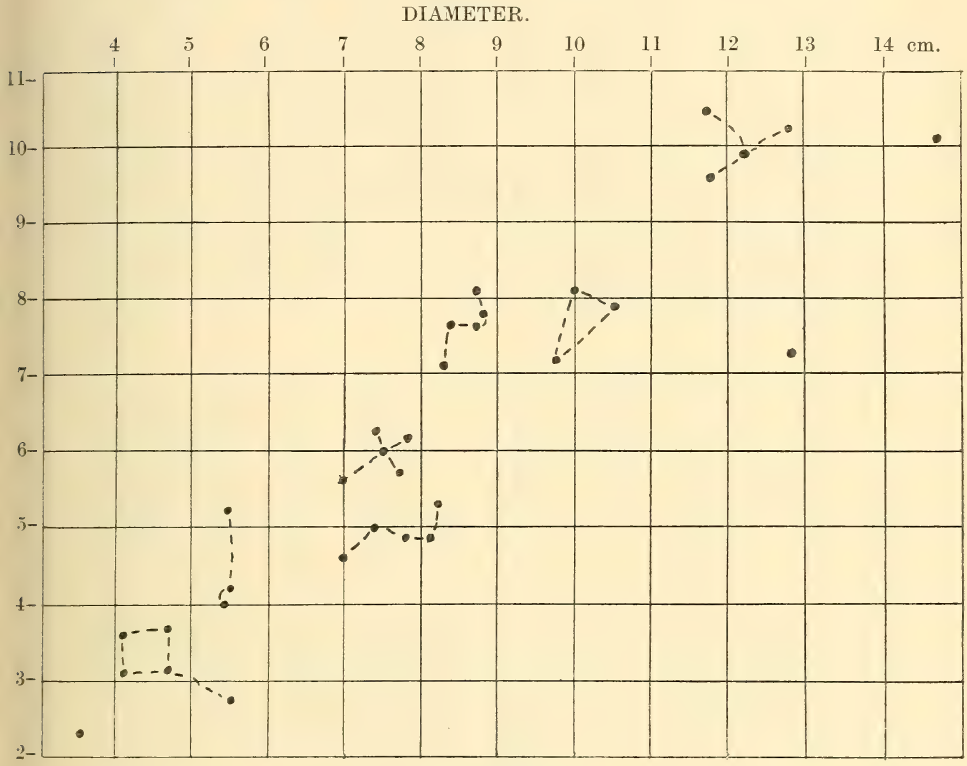


FIG. 6.—Koffiefontein B.

The result of this separation of material yields a picture of alternating types. There are two explanations possible. Either we are dealing with the function of two different distributions at Koffiefontein, or alternatively we are dealing with the same series at different stages in the process of serial copying. If the former is true, the parallel between the two series is the result of a remarkable coincidence. If the latter, then we are presented with the products of a slow change induced by copying over a period of time. We can tentatively regard the two series as being chronologically and spatially separate, though it is impossible to suggest which may be the earlier.

It is at once evident that in a congested focal area, such as the Free State, more exact evidence of provenance is essential. It may even be necessary to mark specimens from a single apparently homogeneous site with such additional data as North, South, Central, etc. A survey of a large area by the methods laid down in Method in Prehistory (South African Archaeological Society, Handbook I, 1945, pp. 96 *et seq.*) may considerably increase our knowledge of a local series. The extension of this ethnological technique to a series of test sites, each a hundred yards square, would provide evidence that could be checked by collation. The collection of data in the field should not be difficult, the real work consists of collation of material later, which would provide a major task. Such evidence is not available at present, and is not likely to be obtainable for some time after the war. The average figures for the two groups are therefore given, and the data is separated accordingly.

K.A.				
i.	12·3	8·3	67·5	1255
ii.	8·8	5·9	67·0	455
iii.	(7·5	7·5	100·0	420)
iv.	6·5	4·6	70·1	195
v.	5·6	3·9	70·0	122
vi.	6·5	1·7	26·1	72

K.B.				
i.	(14·7	10·1	68·7	2185)
ii.	12·6	10·1	80·0	1605
iii.	(12·8	7·3	57·0	1195)
iv.	10·0	7·8	78·0	780
v.	8·5	7·6	89·4	550
vi.	7·5	5·9	78·9	330
vii.	7·5	4·9	65·3	275
viii.	5·5	4·5	81·9	136
ix.	4·8	3·1	64·6	71
x.	(3·5	2·3	65·7	28)

While no comparisons are given here, other areas and groups are compared to these two series, and a cross reference should quickly show the relationship of the various surrounding averages. Koffiefontein B provides the material for the Winterveld migration.

KOFFIEFONTEIN A (ASJ AND UCT ONLY).

ASJ 10/41 .	13·5	9·0	66·7	1640	5·8	2·6	
64/38 .	12·0	(8·0)	66·7	1150	5·5	..	
10/41 .	11·2	8·0	71·4	1005	5·4	3·5	
64/38 .	9·0	(6·5)	72·2	525	3·0	2·8	
	8·9	6·3	70·8	500	3·9	2·9	
	9·1	6·0	65·9	495	4·6	2·7	
	7·7	8·2	106·5	485	4·7	3·6	Hammer.
10/41 .	9·4	5·5	60·1	485	4·2	2·5	
64/38 .	8·6	6·1	70·9	450	4·2	2·7	
	(9·0)	(5·5)	61·1	445	3·0	1·5	Fragmentary.
	8·2	5·8	70·7	390	4·5	3·4	
	8·5	5·3	62·3	385	4·0	2·2	Grinder.
	7·3	6·9	94·5	370	4·2	0·7	

KOFFIEFONTEIN A (ASJ AND UCT ONLY)—*continued.*

ASJ 64/38 .	6·7	5·2	77·6	235	3·1	2·4
	6·8	4·5	66·2	205	3·5	2·4
	6·4	4·6	71·9	190	2·9	1·7
29/35 .	6·3	4·6	73·0	185	3·9	2·3
10/41 .	6·0	3·8	63·3	137	2·3	1·2
64/38 .	5·7	3·8	66·7	123	3·1	1·8
	5·7	3·6	63·2	117	3·0	1·8
	5·0	4·4	88·0	110	2·8	2·3
UCT 35/137 .	6·1	2·0	32·8	74	2·2	1·9
ASJ 64/38 .	7·0	1·3	18·6	64	2·3	0·8

I suspect that the first specimen listed above represents a group of its own, and that it really belongs, in spite of its accession number, to series B. I make this deduction from material listed later under the Winterveld area, that suggests closer affinities with Koffiefontein B than with the A series, though types represented in both are present in WV.

KOFFIEFONTEIN B (MMK AND WUA ONLY).

MMK 1310 .	14·7	10·1	68·7	2185	4·2	2·0	
WUA 226 .	12·8	10·3	80·5	1690	6·1	3·7	
1100A .	12·2	9·9	81·1	1475	4·5	..	Ss. 1·84 kg.
MMK 1432 .	11·7	10·5	89·7	1440	4·3	2·6	
WUA 235 .	11·8	9·6	81·3	1335	5·4	3·4	1·8 kg.
MMK 1311 .	12·8	7·3	57·0	1200	4·8	3·2	Mudstone.
1310 .	10·5	7·9	75·7	872	3·6	..	
WUA 232 .	10·0	8·1	81·0	810	4·3	3·0	Irreg. Ss.
236 .	9·7	7·2	74·2	680	4·3	2·4	
MMK 1313 .	8·7	8·1	93·1	615	3·6	..	
WUA 1100B .	8·8	7·8	88·6	605	4·1	..	Ss.
1100E .	8·7	7·6	87·3	575	2·0	..	
789A .	8·4	7·6	90·0	535	4·5	3·1	Subcylindrical.
231 .	8·3	7·1	85·5	490	4·1	2·2	Mudstone.
MMK 398 .	7·8	6·2	79·5	380	3·7	2·0	
1310 .	8·2	5·4	65·9	365	3·8	2·4	
WUA 1100F .	7·4	6·3	85·1	345	2·4	..	0·45 kg.
1100D .	7·7	5·7	74·0	340	2·4	1·8	Ss. 0·54 kg.
230 .	7·5	6·0	80·0	335	2·4	..	
MMK 1791 .	8·1	4·9	60·5	320	4·6	2·6	
2638 .	7·8	4·9	62·8	300	3·0	2·3	
WUA 227 .	7·4	5·0	67·6	275	3·8	2·5	Ss.
234 .	7·0	5·6	80·0	275	3·0	2·3	
MMK 1432 .	7·0	4·6	65·7	235	3·9	2·7	
WUA 789B .	5·5	5·2	94·5	155	3·0	1·7	
MMK 1745 .	5·5	4·2	76·4	127	2·6	1·5	Four faces ground.
WUA 237 .	5·4	4·0	74·0	117	2·5	1·3	Ss.
MMK 1536 .	5·5	2·7	48·7	83	3·6	2·0	
1637 .	4·7	3·7	78·7	82	2·5	1·4	
1717 .	4·7	3·1	66·0	68	2·6	1·2	
1537 .	4·1	3·6	78·0	61	1·5	0·6	
2227 .	4·1	3·1	75·6	52	2·2	1·1	
1891 .	3·5	2·3	65·7	28	2·1	0·9	

Other Free State Sites.

The extraordinary richness of this area, and the vagaries of collection make it impossible to give any real picture. What additional evidence is available should be collected by the various institutions concerned before it is utterly lost. All that I can hope to do here is to discuss those patches that appear to provide culturally "pure" series, in order to provide data for the isolation of types by distribution when further more exact evidence is available. Sites are therefore grouped by typology rather than on geographical grounds. With nomadic peoples wandering in relation to the varying availability of water in an area such as this, that is all we can at present hope to do.

Many types can be linked with the Middle and Lower Vaal areas. Some types are very "dominant" or persistent, others appear to be recessive, and to occur in one or two areas only. Perhaps this is important, more especially when types persist over great areas or cover long distances, such types should repay watching.

The main reason why the Free State is such a difficult area lies in the plateau structure of almost the entire area. This plain is cut, never very deeply, by a number of rivers flowing west to the Vaal, to yield a down-like countryside, never impeding migrations and minor movements in any direction. The reasons for analogies on the Middle and Lower Vaal should therefore be obvious as well.

CFS. Central Free State Group.

This group is mainly characterised by the relative closeness of the averages. All diameters lie between 7·5 and 11·3 cm. and all heights are below 8·0 cm. This gives the impression that a distribution such as that given above for the Vaal-Harts area, and a scatter such as this, would cover most of the Free State types. Alternatively the NWT. area added to this group would yield much the same result. The CFS material thus appears to be a fundamental component of the region.

i.	(11·0	7·0	63·6	845)	VMR. iii.
ii.	9·5	7·5	79·0	680	MF. v, KB. iv, MFG. v, LV. iii, SCV. ii.
iii.	8·4	6·5	77·4	460	SEFS. vii.
iv.	8·3	4·7	56·6	325	SEFS. viii.

Eagle's Nest (Petrusberg-Boshof Rd.).

WUA 669 .	11·1	7·0	63·1	865	4·6	2·9	
ASJ 11/40 .	9·9	7·3	73·4	680	4·9	3·6	Grinder.
	9·4	7·5	80·0	665	4·4	2·7	
SAM 4601 .	(8·5)	6·3	74·1	455	(3·8)	(2·7)	Broken.
	8·5	7·1	83·5	515	4·6	(2·5)	
ASJ 11/40 .	8·2	6·6	80·5	445	4·0	2·6	
SAM 4601 .	7·6	5·9	77·6	340	3·9	2·3	

M. C. Burkitt's example from this site (South Africa's Past in Stone and Paint, p. 94) is much smaller, measuring approximately 5·7 × 4·7 cm. Compare KB. viii.

BLAAUWHEUVEL.							
ASJ 25/35 .	8·9	6·5	73·0	515	4·5	3·0	
	8·7	4·6	52·9	350	(3·5	2·3)	Conical bore.
	8·4	4·9	58·3	345	3·4	2·6	
	8·2	4·9	60·5	320	4·4	2·9	
DRIEKOPSEILAND.							
ASJ 14/42 .	9·5	7·7	81·1	695	3·9	..	
GOEIEMANSBERG, LUCKHOFF.							
WUA A/39 .	9·7	7·3	75·3	685	3·4	1·1	Ss. ·82 kg.
LUCKHOFF.							
SAM 4684 .	9·2	7·4	80·4	625	4·0	2·3	Shale or Ss.
PLOOYSBURG.							
MMK 2636 .	8·4	4·4	52·4	310	3·0	2·5	
EMMAUS.							
MMK 1294 .	11·0	7·1	64·5	860	5·8	3·4	Shale.

AG. ALEXANDERSFONTEIN GROUP.

As would be expected this group shows some relationship to Kimberley. Only two types of any value are represented. All specimens are small, the largest having a diameter of 9·0 cm. This suggests a general affinity with CFS. iv, with the addition of even smaller elements.

i.	(9·0	5·2	62·8	425)	MV. xi.
ii.	(7·3	2·8	38·3	150)	Anomalous.
iii.	(4·6	2·2	47·5	48)	

BANK'S DRIFT.							
MMK 1897 .	9·0	4·8	53·3	400	4·2	3·0	Epidote diabase.
1184 .	4·5	2·4	53·3	50	2·2	2·8	Ss.
ALEXANDERSFONTEIN.							
ASJ 36/35/1 .	9·0	5·6	62·2	455	4·2	..	
	7·3	2·8	38·3	150	2·3	1·9	Anomalous.
	4·8	2·0	41·7	46	2·0	1·6	

MF. MODDER-FAURESMITH GROUP.

These sites may be taken somewhat uncomfortably together. I can see no reason why Fauresmith district should associate itself with the Modder River, and yet show no real relationship with the Riet River which lies nearer. The Modder River site is immediately below the junction of the Riet and Modder, where the railway crosses from Kimberley southward. The nearest point in the Fauresmith district is perhaps 30 miles, and part of Jakobsdal district intervenes.

i.	13·1	11·2	85·5	1920	MV. ii.
ii.	11·4	9·7	85·1	1260	VH. iii.
iii.	(11·5	8·5	74·0	1125)	KA. i, VMR. i, SWT. i.
iv.	(9·2	10·5	114·1	890)	Anomalous.
v.	9·0	7·4	82·2	600	KB. v, SSV. ii, CFS. ii.
vi.	6·0	3·8	63·3	137	KA. v.

MODDER RIVER.							
MMK 1297 .	12·7	11·6	90·1	1870	4·6	2·0	Ss.
404 .	11·9	10·2	85·7	1445	5·1	3·1	Ss.
2357 .	11·7	9·6	82·0	1315	5·6	3·2	Ss.
SAM 815 .	11·5	8·6	74·6	1140	4·9	3·6	
MMK 756 .	11·4	8·4	73·7	1095	5·3	3·0	
WUA 607 .	9·6	6·9	72·0	625	5·7	3·0	
MMK 192 .	6·2	3·6	38·1	138	2·4	1·3	
FAURESMITH DISTRICT.							
ASJ 26/35/5 .	13·7	11·0	80·3	2065	5·7	3·3	
66/38/1 .	13·0	11·0	84·6	1860	5·8	3·7	
28/35 .	10·5	(9·6)	91·4	1060	3·2	2·7	
	9·2	10·5	114·1	890	3·4	2·6	
28/36 .	(9·0)	(7·5)	83·3	(605)	2·7	2·1	Fragmentary.
28/35 .	9·1	7·1	78·0	590	4·2	2·6	
	6·0	4·3	71·7	155	3·4	2·0	
	6·5	3·5	53·8	147	3·2	2·0	
KLIPPLAAT, FAURESMITH.							
WUA A/81 .	6·1	4·4	72·1	165	2·7	1·6	8 feet deep. Diabase.
AVALON.							
ASJ 9/38/11 .	8·9	8·0	90·0	635	4·2	1·7	Surface pecked. One face flattened.
RAMAH MANOR.							
MMK 185 .	5·2	3·4	65·4	92	2·8	1·4	

SEFS. SOUTH-EASTERN FREE STATE.

Held together by the Smithfield series, these sites show some homogeneity. The Smithfield material appears to be of less real value than was at first thought. I have been able to discover that Dr. Kannemeyer was in the habit of leaving collections of stone implements at the homes of his country patients, from where they would be collected at a later date, put together and sent to Dr. Péringuey at the South African Museum. It is perfectly possible that the bulk of the collection is from the neighbourhood of Smithfield, but it is probable that individual examples came from neighbouring districts—Bethulie, Rouxville, and perhaps even from Burghersdorp and Aliwal North, where he was a fairly regular visitor. These last two districts lie on the southern side of the Orange River, outside this region.

i.	(14·2	12·4	87·3	2500)	Bethulie dist. MV. i, WV. i.
ii.	12·4	12·1	96·8	1860	MV. iii.
iii.	12·5	10·0	80·0	1565	KB. ii.
iv.	12·0	7·5	62·5	1080	KA. i.
v.	(9·9	8·8	88·1	860)	
vi.	10·1	7·0	69·8	715	KB. iv, WV. v.
vii.	8·9	6·3	70·1	500	KA. ii, WV. vii, CFS. iii.
viii.	8·7	5·3	60·9	400	KA. ii, AG. i, CFS. iv.
ix.	7·4	5·7	77·0	310	KB. vi.
x.	6·0	4·4	73·3	158	KB. viii, WV. ix.
xi.	(7·5	2·0	26·7	..)	Herschel only.
xii.	5·0	2·9	58·0	67	KB. ix, WV. x.

This area shows a fairly considerable resemblance to the two series, Koffiefontein A and B, taken together. Types vii, viii above are a twinned cluster. Type v shows a general resemblance to individual specimens in NWT. iii, MV. vii, LV, iii, etc. It is an unconvincing group in itself, and no comparisons have therefore been made.

SMITHFIELD.							
SAM 1117 .	13·0	11·5	88·5	1945	4·4	..	
Kann. .	12·4	12·4	100·0	1905	6·0	3·5	Granite.
	12·5	11·3	90·0	1770	2·5	..	Started. Hole 3·2 cm. deep.
1850 .	13·0	10·4	80·0	1760	5·6	2·5	
	13·2	9·9	75·0	1725	5·4	2·9	Ironstone nodule.
	12·0	9·5	79·1	1370	5·0	3·0	Ironstone nodule.
	12·0	8·0	66·7	1150	4·2	2·8	Coarse ss.
Kann. .	10·5	8·5	80·4	925	3·4	3·0	Subcylindrical.
822 .	11·1	7·0	63·9	865	3·2	2·9	Ss.
796 .	9·2	9·2	100·0	780	3·3	..	
822 .	(10·3)	7·6	73·7	805	(4·2)	(2·6)	Shale fragment.
1117 .	10·0	7·5	75·0	750	3·3	..	Ss.
1830 .	10·3	7·0	68·0	745	4·1	..	Coarse Ss. Pecked.
796 .	10·1	7·1	70·0	715	4·1	2·0	Ss. Pecked.
796 .	10·2	6·5	63·5	675	4·0	2·1	Ss. Pecked.
822 .	9·5	7·0	73·7	630	4·0	2·5	Sandy shale.
1117 .	9·6	6·7	70·0	615	4·2	2·3	Ss.
1830 .	9·0	6·4	71·1	520	4·0	2·3	Ss. Pecked.
Kann. .	9·2	(6·0)	65·2	510	3·9	(2·5)	Hollow in centre. Nodule.
1830 .	9·0	5·1	56·7	415	(4·0	2·5)	Shale. Conical bore.
822 .	8·9	6·6	74·2	525	3·5	..	
1830 .	8·9	6·0	67·4	475	3·5	2·2	Quartzitic Ss.
1117 .	8·6	6·0	70·0	445	3·5	..	Ss.
1830 .	(8·4)	5·4	64·2	380	4·5	3·0	Ss.
	7·7	5·8	75·3	345	3·5	(2·6)	Nodule. Hollow centre.
	7·1	5·7	80·3	285	3·0	1·8	Nodule. Hollow centre.
	6·6	5·2	78·8	226	3·5	1·7	Ss.
1830 .	6·0	5·0	83·3	180	3·0	1·0	Nodule.
1117 .	7·0	3·8	54·3	185	4·1	2·0	Ss.
796 .	6·4	4·4	68·7	180	2·9	1·0	Ss. pebble. Pecked.
Kann. .	6·5	4·2	64·6	177	2·8	1·6	Ss. Pecked.
1117 .	6·0	4·0	66·7	144	2·8	..	Ss.
	5·8	4·3	74·1	145	2·2	1·5	Fine grained nodule.
1830 .	4·8	2·9	60·4	67	2·9	1·3	Ss. Pecked. Fine example.
1117 .	4·6	3·0	65·2	63	2·0	0·8	
SMITHFIELD POORT.							
SAM 797 .	5·9	4·6	77·9	160	2·0	1·0	Hollow centre. Possibly metal bored. Smithfield C.
PHILIPPOLIS.							
ASJ 9/38/6 .	12·2	7·2	59·0	1070	4·7	2·6	

BETHULIE.							
MMK 2237 .	14·2	12·4	87·3	2500	5·4	3·5	
	11·9	10·2	85·7	1445	3·5	2·4	
TMP 1859 .	7·6	5·6	73·7	325	3·8	2·2	
MMK 2237 .	5·8	3·0	51·7	101	2·8	1·4	
CUSTOZZA, ZASTRON.							
WUA A/1 .	4·9	2·6	53·1	62	2·2	1·3	·07 kg.
HERSCHEL.							
SAM 496 .	7·6	2·0	26·3	115	3·1	..	
WELTEVREDE, FAURESMITH.							
WUA A/41 .	12·7	6·6	52·0	1065	5·0	4·9	Mudstone. Cyl. bore.
A/40 .	10·2	6·2	60·7	645	4·4	2·8	·82 kg.

Associations in the Free State.

The question of the association of the bored stone in the Free State has been cleared up once and for all by Professor C. van Riet Lowe in his field research in that area. Much of the material was destroyed, or labels were burnt, in a fire at the University of the Witwatersrand some years ago, but his notes still remain, and the following is a list of the sites on which he could definitely associate bored stones with Smithfield B implements. Even in cases where the material has survived the implements are often too broken to be reasonably measured. The fact of association is sufficient. Farm names and numbers are given.

Avalon 554
Bankfontein 417.
Blaauwbanksdrift 195.
Brakfontein 231.
De Kiel Oost 101.
Die Aar 332.
Eagle's Nest 550.
Il Paradiso.
Koffiefontein Town Lands.
Klein Philippolis.
Koningfontein.
Kopjeskraal.
Lockshoek 192.
Mokari 50.
Paardenvallei 668.
Pramberg 15.
Rooibrak 106.
Smithfield.
Spitzkop 155.
Slagtkraal Drift.
Telegraaffontein 644.
Tygerfontein.
Uitdraai 357.
Wagenmakersdrift 24.
Weenkop 434.
Wepener Town Lands.

The Pramberg specimen is pyriform, the Tygerfontein example is an unfinished conical-bored example. The list is taken from van Riet Lowe's field-notes and is probably not complete, as many sites listed there merely state, "full range of implements." These have not been included, nor have the sites where borers only are mentioned.

Literature on the Free State Region.

In addition to the papers written by Professor C. van Riet Lowe, and noted above, there is a certain amount of literature on this region. Rev. S. S. Dornan writing in 1909 * notes that "The first immigrants came principally from the Cape Colony, from where they were hunted out by Dutch commandoes. These bands lived in what is now known as the conquered territory, and their centre was a cave in the neighbourhood of Hermon, to the west of this country near Wepener. The Bushman name for this part was Qibing—a locative case from Qibi, a digging stick." We may note that the letter "q" is here used as a click, and that, if the derivation is correct, the locative follows the Sotho, not the Bushman form. He continues (p. 443): "The roots were dug up with a digging-stick called the Qibi, a straight, tough piece of wood about three feet long, pointed at the end. It was inserted into a circular stone and wedged tight. The labour taken to round and bore these stones with no tools but their hands (*sic*) must have been immense."

Perhaps the most interesting account, historically if for no other reason, comes from the pen of Dr. D. R. Kannemeyer, to whom the South African Museum is indebted for the large collection of stones listed here from Smithfield, Albert District, and some from Burghersdorp. His paper is almost impossible to obtain to-day, and extracts may therefore be quoted from it.† It is to be remembered that Kannemeyer uses his own orthography in writing Bushman, using an apostrophe followed by a consonant to designate the appropriate clicks. In addition this was a popular article, and he makes various statements without much support.

"Lying scattered over the country, but most frequently found in the beds of the springs, or in their neighbourhood, these round perforated *'ka 'ka 'kouwie*, or digging-stick stones, still occur in fairly abundant numbers. They are often unearthed by the plough. They are becoming scarcer than they used to be. . . . Yet I have managed to collect about two hundred during the last few years, the largest weighing close upon seven pounds, the smallest one ounce.

"These perforated stones were used by the women to weight the

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* Dornan, "Notes on the Bushmen of Basutoland," Trans. S. Afr. Phil. Soc., vol. xviii, pp. 437–450.

† D. R. Kannemeyer, "Stone Implements," Cape Illustrated Magazine, vol. i, 1890, pp. 120–130.

'cibi or sharp-pointed fire-hardened stakes employed in digging *taauwing* or bulbs, and *'taau 'tke 'tkaubitse,* or termite larvae. They were secured by one or two wedges. or rested on a bulge left in the middle or upper part of the stick. The pitfalls used for entrapping game were also dug by means of these weighted digging-sticks.

"There can be no doubt that these digging-sticks were intended for and used as pick-weights, not as war weapons, nor are they relics (war-weapons), as Col. Bowker once thought, of an earlier pre-historic race preceding the Bushman, who, finding them ready to hand, adapted them to the uses they put them to.

". . . what a tale of maternal love and care, what a fond desire to gratify and amuse their tender offspring do these toy *'ka 'ka 'kouwies* reveal! In weight an ounce, and only fit to be used by very young children, they were not very efficient instruments.

"Some of these 'stick-stones' were made of traprock. These were invariably more carefully finished, rounded and smoothened than those made from sandstone, and must have required a great deal of expenditure of time and trouble to complete, especially when we consider the imperfect appliances at command. The older series shows the most careful workmanship. They are scarcer than the less highly finished ones, to which I shall presently allude, for they are found more deeply buried. They were perforated by means of wedge-shaped stone borers or rimers. . . . Many of these have their boring end worn down to great smoothness, and show a complete abrasion of the salient ridges, which gave the necessary grip. . . . Several are only partially used, or not at all.

"When contact with other nations gave the Bushmen iron, the stone drill was discarded. As a rule these later metal-drilled stones were not so carefully finished. They have a roughish and uniform bore, and have their shortest diameter in the line of perforation. . . . In the older stone-drilled ones the aperture is highly polished and double bell-mouthed, and is made along the longest diameter. This latter peculiarity is so constant that it may almost be considered as a diagnostic mark of age. In all cases the stone was first rounded and then perforated, as these numerous examples, ranging through all stages of the process, show . . .

"That the cruder and less carefully finished stones are the most recent in time is proved by various considerations—for instance their fresh look, their superficiality, and the partially perforated state in which so many of them are found. . . .

"Occasionally they were used for other than digging purposes. I have found one on which one side shows evident signs of having been used as a muller, on the other it has one of the grooves for polishing the stone (? bone) arrowheads."

With reference to Kannemeyer's suggestion that the small bored stones were made for children, mention may be made of the evidence of Mr. Turner of British Bechuanaland, who told Miss M. Wilman

of the McGregor Museum, Kimberley, that he had once seen a family of Bushmen, all of whom carried digging-sticks. The children had small specimens. Whether these were made for the use of children or were picked up by them and used in imitation of their elders it is not known. This statement, made by Mr. Robert Turner, of Lukasdam, Postmasburg, is the more surprising when we realise that the only specimen that comes from that farm is an exceptionally large soapstone example (MMK 191), and none of the Postmasburg material is less than 10·8 cm. in diameter. While it is perfectly possible that small examples were used by children, it is as likely that these were originally knobkerrie heads. The point has little importance in the present paper, as in any case we are dealing with examples by size and form, and have to discard any attempts to say how individual specimens were used.

An illuminating extract from a letter by Dr. Kannemeyer to Dr. Péringuey of the South African Museum, dated 3rd May 1909, gives us some information on the source of the above article, and may well be published here:

> "My informant who gave me the names of the different implements, etc., was an intelligent Cape-boy, whose father was a child of Landrost Vollenheim of Swellendam during the Dutch régime. He was brought up on a mission station in the interior where mostly Bushmen were located, and he spoke their language fluently and had seen their handicrafts. I had only one interview with him: he died before I could pump him further. He called them *'Ka 'Ka 'Kouwie* (the digging-stick) and the—(here follows a sketch of a typical Smithfield B endscraper)—skinning flake, *'kuin.*"

Further reading on the Bushmen in the Free State can be found in Ellenberger and MacGregor,* though we need hardly subscribe to their theories on the origins of the Bushmen.

Suggestions for further Reading.

We have now reached the end of our first major migrational movement, and have discussed the end-products in a heavily "documented" focal area. The Thirstland Region, south of the Orange River, seems to have held back migration for a considerable time. From the Orange River southward we follow a second series of migrations, distinct from those that fed the Free State, but fed from that region.

* Ellenberger and MacGregor, History of the Basuto. London, 1912.

The reader is asked to turn on to the South-Eastern Region if his interest lies in that direction (p. 72). If the Namaqualand route is to be followed, he should turn to the Thirstland Region, and study the Kaaienveld and Namaqualand areas (p. 64), ignoring the Trekveld and Winterveld. Finally, if the southern end of the continent is his field, he should turn to the Trekveld, Winterveld, and Roggeveld, or follow the Karoo route to the South Coast, and finally to the Cape Region (pp. 81, 97). We have reached the parting of the ways.

We now turn back to Region I, to study the Western Bypass, by which types have passed down the eastern side of the Kalahari, deep into the Thirstland Region, to the Bokkeveld.

V. WESTERN BYPASS.

We return now to Region I, the Transvaal, and from its western end we trace the pathway of a major migration, five hundred miles in length. The route started in the Vryburg district and touched the sources of the Molopo River; from here the path can be traced southward, parallel to the Vaal but 80 miles farther west. The Groenwater River is followed to the Orange, where there is some lateral movement between Kakamas and Prieska, then the highway seems to follow the Hartbees stream, deep into the flank of the Trekveld and Winterveld areas, to Groetvloer, van Wyksvlei, and on to the Bokkeveld area.

The Molopo-Groenwater section coincides generally with the route taken by the MaNtatisi movement a century ago, and it is possible that some individual examples may belong to that Bantu movement, but I would suggest that, whoever may have followed this route in recent years, it represents the eastern border of a great triangle of roads, related to the Kalahari border. We are dealing now with the north-south route and with movements east and west along the Orange River bed above the Aughrabies Falls, but the Molopo riverbed itself must have provided another route in good years, probably feeding the Namaqualand area. Further knowledge of the unknown desert should give us this information.

The crossroads, where this great highway leaves the Groenwater valley to follow the Brak and Hartbees Rivers, south of the Orange, would have been difficult to recognise, had it not been for energetic help provided by Mr. C. Wilmot, postmaster of Prieska, who has collected a number of important specimens, through the co-operation of farmers in that general area, and has sent them to the South African Museum. All the examples from about here, with numbers SAM

5014 and over, have been submitted through him, each with the most exact possible provenance. I would therefore like to thank him for his keen co-operation and help. Specimens with numbers higher than SAM 5042 arrived too late for inclusion in type averages.

The Bypass has been divided into three areas: the Molopo-Groenwater, the central Upington-Hartbees area, and the Southern or Bokkeveld area. The first shows affinities with the Transvaal generally, and with the Vaal-Harts area. There seems to have been some lateral exchange with the Middle Vaal as well, but farther south contacts do not seem to be so evident.

Typical of the two northern areas on the Bypass, is a gap between types with a thickness of 10·5 cm. and 7·5 cm. The thicker types are lost in the southernmost area, but the thickness of the remainder increases slightly to a limit of 8·0 cm., here the upward limit.

We may epitomise the changes that occur by giving the measurements of each of the averages in columns, with their parallels opposite them. Types which do not recur are left out.

	MG.			UH.			BV.	
i.	13·7	11·2	i.	12·5	11·3			
ii.	12·3	7·2	iii.	12·0	7·3	ii.	12·4	7·7
iii.	10·8	6·5	iv.	10·7	6·8	iii.	10·3	7·2
vi.	6·5	4·2	v.	7·1	5·5			

I think the picture given provides an unassailable argument in favour of the approach to the whole subject, here used for the first time (see map 8).

MG. Molopo-Groenwater Area.

i.	13·7	11·2	81·8	2100	UH. i, VH. i, TV. i.
ii.	12·3	7·2	58·8	1090	UH. iii, BV. ii.
iii.	10·8	6·5	60·0	760	UH. iv, BV. iii, NFS. ii, VMR. iv.
iv.	(11·0	4·4	40·0	530)	ET. iv, CT. vii.
v.	8·5	6·0	70·6	435	MV. xi, LV. vi, SCV. iii.
vi.	6·5	4·2	64·6	177	UH. v, ST. iii.

Specimens marked MMK 2078–9 from the Kuruman area yield a single group with the Wolhaarkop example (MG. v). These might just as well have been included with the Middle or Lower Vaal areas, and show a lateral movement from that river. This movement will be discussed later in dealing with Migrations.

Rooiberg, Vryburg.							
SAM 1104 .	12·6	6·8	53·0	1080	4·0	2·5	Ss. Fine radial cuts at both mouths.
Vryburg A.							
MMK 488 .	14·3	10·8	75·5	2210	5·3	1·8	
679 .	12·7	10·8	85·0	1740	5·1	2·5	

KURUMAN.							
MMK 920 .	12·2	7·5	60·2	1200	5·0	3·6	
ASJ 23/39 .	11·3	4·2	37·2	535	2·8	2·3	
MMK 2078 .	9·0	6·1	67·8	500	3·8	1·9	
2079 .	8·5	6·7	78·8	485	3·4	1·7	
2078 .	8·8	5·8	66·0	450	4·1	1·7	
717 .	6·0	4·3	71·7	155	3·4	1·4	
POSTMASBURG.							
MMK 252 .	14·3	12·0	83·9	2455	5·3	3·2	
2709 .	10·8	6·2	57·4	725	3·8	2·0	
WOLHAARKOP.							
MMK 1285 .	7·9	5·5	70·0	345	4·0	2·3	
MATZAP.							
ASJ 36/35/19	10·7	4·5	41·0	560	3·9	2·7	
KLIPFONTEIN, NIEKERK'S HOPE.							
SAM 5015 .	12·3	11·1	90·0	1680	5·8	3·5	
GOUP.							
MMK 1487 .	6·9	4·1	60·0	195	2·9	1·7	
BULFONTEIN, KOEGAS.							
SAM 5032 .	11·9	7·0	59·0	1000	4·1	3·6	Hard talc. Pecked.
NUWEVLEI, KOEGAS.							
SAM 5047 .	9·0	5·8	64·4	470	4·4	1·6	Granitic rock.
ERFRUST, GROOT NAUTE.							
SAM 5034 .	10·5	6·8	64·8	750	3·3	3·2	Hard talc. Smooth. Beautiful specimen.

The Nuwevlei example arrived too late to be included in the type averages, but it agrees well with type v.

UH. UPINGTON-HARTBEES AREA.

This distribution cuts down to the centre of the dry country between the Orange River and the south-western Cape, with its winter rains. From here on it is probably lost in the surrounding distributions. Type iii appears again in the Roggeveld, and type iv at Calvinia.

i.	12·5	11·3	90·3	1770	MG. i.
ii.	(16·2	5·2	32·1	1365)	Possibly Bantu.
iii.	12·0	7·3	61·0	1050	MG. ii, BV. ii.
iv.	10·7	6·8	63·5	780	MG. iii, BV. iii.
v.	7·1	5·5	77·4	275	MG. vi, TV. iii.

VROUPAN, WILDEBEESPAN.						
SAM 5017 .	7·8	5·0	64·0	305	3·1	2·4
KLIPDRIFT.						
PEM 614D .	12·0	6·8	56·7	980	4·2	2·6

EREENSPAN, REDLANDS.							
SAM 5036 .	12·6	7·5	60·0	1190	5·4	4·0	? Ss.
WITVLEI, FRANSENHOF, PRIESKA.							
SAM 5043 .	14·0	12·0	85·7	2350	5·2	3·8	Grey ss. Erratic.
MIDDELWATER, PRIESKA.							
SAM 5030 .	11·0	6·8	61·8	830	3·5	1·2	Pecked.
UITDRAAI, PRIESKA.							
SAM 5035 .	13·2	(11·0)	83·3	1915	4·5 ×	3·0)	Oval hole. Signs of sharpening at one mouth. Soft talcy sandstone.
UPINGTON.							
SAM 412 .	11·8	7·5	63·5	1045	4·1	2·8	
MMK 697 .	10·3	6·8	66·0	720	4·8	2·4	
ERFSE PLAAS, HOPETOWN.							
SAM 5042 .	10·1	6·5	64·3	665	4·4	..	Dolerite. Battered.
KENHARDT.							
Univ. Stell. .	12·0	7·3	60·8	1050	4·0	2·3	
MMK 265 .	16·2	5·2	32·1	1365	3·9	1·9	? MaNtatisi.
GROOTVLOER.							
SAM '94 .	12·6	11·3	89·7	1795	3·9	2·5	
KEURFONTEIN, VOSBURG.							
UCT 36/— .	12·8	11·6	90·6	1900	4·2	2·6	Smithfield B. Assoc.
UCT 36/— .	6·3	5·4	85·7	214	1·9	1·1	Do. do.
GROOTFOURIESKOLK, SPRINGBOKPOORTJE.							
SAM 5031 .	11·8	(11·0)	93·2	1530	4·9	..	Soapstone; very irregular. Worn, unfinished.
POORTJE, OMDRAAIVLEI.							
SAM 5044 .	13·5	6·8	50·4	1240	5·3	3·7	Ss.
VANWYKSVLEI.							
SAM 1125 .	7·3	6·0	82·2	320	2·8	1·9	

The Witvlei and Poortje specimens arrived too late to be included under the type averages. Both fail to agree well with local types. The first is an erratic that merely brings the MG. i type a few miles farther south, to the southern bank of the Orange River. The Poortje example is somewhat anomalous, though it may be a variant of group UH. iii.

It may be noted here that the Trekveld Area (p. 69) seems to have some affinities with these first two stages in the Western Bypass, but not with the further extension to the Bokkeveld area. These will be discussed later under Migrations. Probably we are dealing with a divergence of types into two routes—the Trekveld and the Bokkeveld. If this is so it may in time permit us to differentiate between types

that passed to the Bokkeveld, and types that entered the Trekveld, thus providing the foundation for some more exact definition of the two groups of people who took the diverging roads.

BV. Bokkeveld Area.

This represents the final coherent distribution of this series. Larger types, with a thickness greater than 8·0 cm., have disappeared, but except for the anomalous example from Calvinia, the various types are all represented along the Western Bypass.

i.	(14·0	8·9	63·6	1745)	Anomalous.
ii.	12·4	7·7	63·8	1150	MG. ii, UH. iii.
iii.	(10·3	7·2	69·8	740)	MG. iii, UH. iv.

Hondeklip Bay.							
SAM 4930 .	12·6	7·8	61·9	1240	4·7	2·6	
Klaver.							
Univ. Stell. .	12·0	7·9	65·9	1140	2·9	2·5	
Calvinia.							
SAM 410 .	14·0	8·9	63·6	1745	4·0	2·7	Anomalous.
4930 .	12·5	7·4	59·2	1160	4·0	2·2	
410 .	10·4	7·0	57·3	755	3·9	2·3	
Univ. Stell. .	10·1	7·3	72·3	745	3·9	..	

VI. THIRSTLAND REGION.

This wide region could never have been thickly or regularly inhabited. If recent climatic conditions are reflected in the present day, then this is an area of long droughts, sometimes lasting seven years, then a short spell of wet years, when there is high fertility, plentiful water and reasonable cloud cover. This has always been an area of game, plains-loving springbok being the most typical animal. Possibly giraffe, buffalo, zebra, and elephant lived here, though sporadic bones of these animals suggest that they were migratory. Game migration has been stopped by essential jackal-proof fencing in this region, and most of the game has died as a result of drought in this typical dry-scrub country.

The region lies south of the Orange River, from about 25° east to the west coast. In the south it is bounded by the Roggeveld mountains, the Nieuwveld mountains and the Sneeuwberg, roughly along the parallel 32° south. The whole area is arid, increasingly so from east to west. It is divided into the Kaaienveld, near Prieska; the Namaqualand area, farther west, together forming the western highway; the Trekveld and Winterveld areas which probably provide a focus for all the remainder. From here we may turn on to the

Nieuwveld-Goup area that links with the Little Karoo and Sundays River to the south-east, to form the southward highway, and with the South Coast Region (p. 81).

KV. Kaaienveld.

This area partly coincides with the Upington-Hartbees area, and marks the crossing of two roads.

i.	(13·1	13·3	101·6	2250)	
ii.	11·1	8·8	80·0	1085	LV. iii, NQL. i, MV. vi.
iii.	11·5	5·4	47·0	715	MV. ix.
iv.	9·2	7·4	80·4	625	LV. v, NQL. iii.
v.	(6·9	6·9	100·0	330)	MV. xi.
vi.	(8·5	4·0	47·0	290)	WV. viii.

Group ii might well be divided into two, 12·0 × 8·8 and 10·9 × 8·8 cm. The former related to Namaqualand i, the latter to Namaqualand ii. The single example from Prieska, forming type v, agrees well with a single specimen from Barkly West to Gonggong (6·9 × 6·4). In general there is considerable agreement with the Middle Vaal.

"Bushmanland."							
SAM 1587 .	12·0	13·2	110·0	1900	3·9	2·0	Anomalous.
,, .	12·2	5·5	45·0	820	4·0	2·3	
Marydale.							
SAM 5022 .	10·9	8·7	79·8	1035	4·0	2·2	Fine ss. Bore and stone deeply patinated.
Witfontein.							
SAM 5033 .	12·0	8·9	74·2	1280	4·4	1·9	Pecked.
Prieska.							
MMK 1849 .	14·2	13·5	95·1	2720	4·9	2·8	Ss.
	12·0	8·6	71·7	1240	5·4	3·1	Ss.
	10·9	9·1	83·5	1080	3·9	2·5	Ss.
SAM 4607 .	10·6	8·8	83·0	990	3·9	2·3	
MMK 1849 .	12·4	5·3	42·7	815	4·6	2·2	Ss. Grinder.
HHC 1047 .	9·5	7·5	79·0	675	3·2	2·5	
MMK 2108 .	9·4	7·6	80·9	670	3·2	2·2	Ss. Smoothed.
SAM 4868 .	9·2	7·4	80·4	625	4·1	2·7	
TMP 8934 .	9·2	7·0	76·1	590	3·8	2·1	
SAM 1099 .	6·9	6·9	100·0	330	3·1	2·5	
MMK 2108 .	8·3	4·2	50·6	290	3·5	1·8	Erratic.
Banghoek, Hopetown.							
SAM 5037 .	11·8	5·0	42·4	695	4·5	2·3	Bad shape. Sandy shale.
Stofbakkies, Prieska.							
SAM 5014 .	11·4	8·5	74·5	1105	4·6	3·0	Ss.
Vigilantsput, Prieska.							
SAM 5020 .	11·5	5·4	47·0	715	5·4	2·2	Ss.
	10·4	(5·1)	49·0	585	5·1	2·6	Hard talc. Worn.

KEIKAMSPOORT, PRIESKA.							
SAM 5045 .	11·9	8·4	70·6	1190	4·6	2·9	Shale.
"KAAIENBULT."							
ASJ 14/41 .	9·0	7·5	83·3	605	4·8	3·5	
MARITZDAM.							
SAM 5040 .	11·9	9·1	76·5	1290	4·1	2·3	Ss. Pecked.
ONGERS SIDING.							
SAM 5046 .	10·5	8·5	81·0	940	3·6	2·7	Ss.
JOHNSTON'S PAN, GROOTDOORN.							
SAM 5019 .	10·9	9·0	82·6	1070	4·6	2·6	Hard talcy shale.
VICTORIA WEST A.							
Sharples 10 .	8·9	7·1	80·0	560	3·0	..	
4 .	8·6	3·8	44·2	280	2·8	2·0	

The specimens from Keikamspoort and Ongers Siding arrived too late for inclusion in the type averages. Both conform to the average KV. ii.

NQL. NAMAQUALAND AREA.

This is the end of a westward movement along the Orange River valley from the Kaaienveld, Trekveld, and Winterveld areas. Though there is no evidence from the north bank of the Orange, I suspect that the Molopo River also brought types directly across the southern Kalahari to this area; probably types iv and v from MV.

i.	12·1	9·4	77·7	1375	KV. ii, MV. vi, TV. ii.
ii.	10·6	8·5	81·9	955	KV. ii, LV. iii, MV. vii.
iii.	9·0	7·4	82·2	600	KV. iv, LV. v.
iv.	8·8	5·1	57·9	385	LV. vi, MV. x.
v.	(4·2	3·3	78·5	58)	WV. x, MV. xiv.

Types i and ii above represent the results of divergent copying from KV. ii. These two, with type iii, can be traced from the Lower Vaal, through the Kaaienveld. The types present in the Trekveld and Winterveld areas (over 12·5 cm. in diameter and 10·0 cm. in height) are absent here, and indeed no examples over that height occur in this area. They probably represent an independent spread which never reached Namaqualand.

"NAMAQUALAND."						
ASJ 49/36/6 .	12·3	8·9	71·5	1345	4·2	2·1
STEINKOPF.						
NMP 2080 .	12·5	9·9	79·2	1545	5·4	2·2
2592 .	11·0	8·8	80·0	1065	5·6	2·5
2342/D .	10·7	8·4	78·5	960	5·9	2·8
2577/A .	10·1	8·4	83·1	855	4·8	2·1

NMP 2342/F .	8·8	7·5	85·2	590	5·3	2·8	
2342/B .	8·8	7·3	81·8	565	4·1	2·0	
2342/C .	8·9	5·1	57·3	405	8·0	3·0	
2577 .	8·3	4·9	59·0	340	3·8	2·2	
2048 .	4·2	3·3	78·5	58	2·2	1·1	Erratic.
CONCORDIA.							
SAM 1394 .	12·0	9·6	80·0	1380	4·1	2·0	
	9·5	7·3	76·8	660	4·0	2·2	
OOKIEP.							
MMP 2517 .	9·3	5·3	57·0	630	4·8	2·9	
KAMIESKROON (BOWESDORP).							
SAM 1763 .	11·6	9·5	81·9	1280	5·4	3·0	
GARIES.							
Dreyer Coll. .	11·0	9·0	81·9	1090	2·4	2·3	Soapstone.

We now return once again to Prieska and the junction of the Vaal with the Orange, and trace a separate movement southward from there. This is related to the beds of the Brak and Ongers Rivers.

WV. WINTERVELD.

The Trekveld and Winterveld areas were originally taken together, but apart from a few overlapping examples, the two show very distinct distributions of types. The Winterveld appears to provide a great highway, from Prieska and the junction of the Vaal and Orange Rivers to the headwaters of the Sundays River in the Koudeveld, making use of the Brak and Ongers Rivers.

i.	14·6	13·0	89·9	2770	MV. i.
ii.	14·6	10·1	69·9	2150	NG. i.
iii.	12·9	9·0	69·8	1495	NQL. i, KA. i.
iv.	10·9	10·1	92·7	1200	MF. ii.
v.	10·0	7·5	75·0	750	KV. iv, KB. iv, CFS. ii, SWB. iv.
vi.	8·1	8·5	104·9	560	KA. iii, BS. iv, KB. v.
vii.	9·1	5·8	63·7	480	NQL. iv, KA. ii, AG. i, BS. v.
viii.	(8·5	4·3	50·6	310)	CFS. iv.
ix.	(5·7	4·3	75·5	140)	KA. v, BS. vi.
x.	3·7	2·5	67·6	35	Probably all beads KB. x.

The comparisons with Koffiefontein A and B suggest that this area is the continuation of a migration from the south-western Free State. The parallels, in the smaller types, with the Bloemfontein-Sepani area seem to carry the migration nearer to its origin.

BELMONT.						
MMK 1178 .	14·2	12·2	85·9	2460	4·8	2·9
1158 .	3·8	3·3	86·9	48	1·3	0·5
HOPETOWN.						
SAM 757 .	4·0	2·1	52·5	34	2·1	..

BANGHOEK, HOPETOWN.							
SAM 5039 .	9·2	6·0	65·3	510	..	..	Just started. Hammer.
PAARDEKLOOF, WELGEVONDEN.							
SAM 5027 .	12·8	9·1	71·1	1490	4·4	2·7	"Cantaloupe quartering" at one end. Ss.
VREDE, UPINGTON.							
SAM 5041 .	12·1	(9·0)	68·7	1545	5·2 × 4·3		Oval cylindrical bore. Split. Ss.
GOODHOPE, PRIESKA.							
SAM 5029 .	14·8	9·9	67·3	2170	5·6	4·4	Soapstone. Oval hole.
ROOIVLOER, OMDRAAISVLEI.							
SAM 5038 .	14·5	(12·5)	86·2	2630	4·7	..	Quartzitic Ss. Started.
PLAATSMABOK.							
SAM 5021 .	14·4	10·0	69·4	2075	6·4	3·6	Fine granitic rock.
FAIRVIEW, POORTJE.							
SAM 5023 .	12·9	(9·2)	71·3	1530	4·7	2·4	Hard talc. Oval bore.
KALKAAR, CARNARVON.							
SAM 5048 .	13·0	8·6	66·2	1455	4·2	2·4	Sandy shale.
CARNARVON.							
SAM 1098 .	9·6	8·0	83·3	740	4·0	2·2	
PEM 615 V. .	8·1	8·5	104·9	560	4·0	1·7	Anomalous.
BRITSTOWN.							
Heese Coll. 1.	15·0	13·4	89·3	3015	4·6	2·4	
2.	14·7	10·4	70·7	2245	4·3	2·3	
3.	13·0	9·1	70·0	1535	5·2	3·7	
SAM 2469 .	10·8	10·2	94·5	1190	1·9	..	
Heese Coll. 4.	10·7	(7·3)	68·2	835	4·0	2·4	
SAM 1753 .	10·2	7·3	71·5	760	4·2	2·4	
Heese Coll. 5	9·7	8·0	82·4	750	2·6	1·9	
17	9·8	7·4	75·5	710	3·8	3·2	
21	9·5	5·7	60·0	515	3·6	2·0	
8	5·7	4·3	75·5	140	2·5	1·2	Anomalous.
11	4·8	(2·7)	56·3	62	2·1	1·2	
MIDDELWATER, BRITSTOWN.							
Heese Coll. A	3·1	2·8	90·3	27	..	0·7	Bead. Metal bored.
B	2·4	2·3	96·0	13	..	0·75	Bead. Metal bored.
PHILIPSTOWN.							
MMK 1111 .	14·2	12·4	87·3	2500	5·0	2·9	
HANOVER.							
SI 31 . .	10·1	7·2	71·3	735	4·1	2·3	
16 . .	8·5	4·3	50·6	310	3·6	2·1	
21 . .	3·7	2·5	67·6	34	2·0	0·5	
GRAAFF REINET.							
SAM 3206 .	13·0	8·9	68·5	1510	4·4	2·7	
F. Malan Coll.	8·7	5·9	67·5	445	3·8	1·9	
JANSENVILLE.							
PEM 614w .	12·8	8·9	68·6	1460	3·9	..	
	11·0	10·0	85·6	1370	2·8	2·3	

TV. Trekveld.

The Trekveld and Winterveld were originally taken together as one great area. While the Winterveld shows a distinct highway, the Trekveld does not; it appears, so far, to be a backwater, with little real relationship to surrounding areas.

i.	13·8	10·4	76·1	1980	MG. i.
ii.	(11·4	9·5	83·3	1235)	KV. ii, NQL. i.
iii.	7·3	4·2	57·5	225	MV. xii.

Three Sisters.							
MMK 1302 .	13·4	9·9	73·9	1780	4·2	2·2	
Victoria West B.							
ELM 1 .	14·0	11·2	80·3	2305	4·0	3·3	
SAM 1494 .	13·8	10·0	72·5	1905	5·5	3·3	
	11·4	9·5	83·3	1235	4·8	2·6	
1662 .	7·5	4·0	53·3	225	2·9	2·0	
Sharples 7 .	7·1	4·3	60·6	220	2·5	..	
Eliaslaagte.							
MMK 39 .	7·4	4·4	59·5	240	3·0	1·7	
Brandvlei.							
SAM 4998 .	7·5	4·1	54·6	230	3·8	2·3	
Kalabasput, Vanwyksvlei.							
SAM 5049 .	13·5	10·0	74·0	1825	5·4	3·1	Sandy shale.
Blaauwkrans, Carnarvon.							
SAM 5050 .	13·4	10·0	73·6	1795	6·1	2·4	Sandy shale.

We have already noted the analogies between this and the Upington Hartbees area, and have suggested the possibility that the Trekveld may be in part related to the Western Bypass.

Bibliography and Commentary.

Not very much has been written on the bored stones of this region, but what has been written has some interest. E. J. Dunn * describes bored stones he collected from various sites in and outside this region, and adds: "The knowledge of the manner in which they were made, however, remains, for the same old Bushwoman that showed me the manner of affixing stone flakes to arrow-shafts described the method, and particularly mentioned the long-pointed stones of hard material, which, she said, were obtained from the Kiljan Veldt." This last is certainly a misinterpretation of Kaaien Bult (or Kaaien Veld). In much the same way he gives Zak River as "Leek River" in giving an

* "Stone Implements of South Africa," in Trans. S.A. Phil. Soc., vol. ii, 1879–80, pp. 6–22.

account of this old woman's methods of attaching stone tips to arrows. This error he partly rectifies in his later work * written thirty years after he had left "the Colony," and here makes Kiljan Veldt into Kijan Veldt. In this latter book he gives a somewhat fuller account of the making of the bored stone, on p. 77 onwards. His illustrations are excellent, but unhappily, as only one view of each stone is given, little can be deduced of a type helpful to us here. In one or two instances it has been found possible to make use of his illustrations, but such evidence is suspect. The collection itself is now in Australia, providing that continent with a relatively useless hoard, and at the same time depriving this continent of valuable material.

W. D. Gooch † comments rather bitterly on Dunn's work and says that he himself, Bleek, and Bowker all failed to find a Bushman capable of making a bored stone, while Dunn had succeeded.

Dr. Bleek seems to have had better luck later, as a letter from his daughter, Miss D. F. Bleek, shows:

"With regard to the question of boring I may mention what an old Bushman woman told me at Kenhardt in 1911. She was the same woman who had been photographed with a digging-stick at Salt River in 1884; the picture forms the decoration on the cover of 'Specimens of Bushman Folklore.' She told me that women bored them, not men; that she had bored one herself; that it had not taken her very long; that it had been done by iron. She was speaking Afrikaans and said '*met e' eister*', and made the motion of twirling with her hands. Of course the earlier ones must have been made with stone borers, but in the years 1840 to 1850 when she was young, iron must have been obtainable.

"The !Xam Bushman have a verb *!kiju,* to knock down by a throw. Their word for a kiri is *!kōken.* Their kiris were made by nature, just a stick that happened to have a knob on it. The Nama for a kiri is *!hoas.*"

NG. Nieuveld-Goup.

Contrary to my usual custom, I have found it advisable to split a single museum-accession group: the Aberdeen series, PEM 514 F, is divided into Aberdeen A, considered here, and Aberdeen B, to be considered under Sundays River area. It seems clear that the ten specimens sent to the Port Elizabeth Museum were not from a single site. Some link with the Thirstland Region, others are related to the Gamtoos, Klein, and Sundays River basin. It is interesting to note

* E. J. Dunn, The Bushman. London, 1931.

† "Stone Age of South Africa," J. Roy. Anthrop. Inst., vol. xi, 1881, pp. 124–82.

that this series shows no relationship with sites at Jansenville and Graaff Reinet.

Averages from here are not convincing, but little is really known of this area. It is related to the Zwartberg and to the Gouritz basin to the south, and Winterveld and Kaaienveld to the north.

i.	(14·6	10·1	69·5	2160)	WV. ii.
ii.	(12·1	11·0	90·5	1600)	
iii.	11·4	8·1	70·5	1050	K. vii, ZW. iii.
v.	(10·5	6·1	58·1	675)	GK. iv.

SUTHERLAND.							
Drennan Coll.	11·6	8·1	69·8	940	4·8	2·3	
	10·6	8·1	76·4	910	4·2	2·1	
BEAUFORT WEST.							
SAM 803 .	14·4	10·2	70·8	2115	4·2	..	
WUA 1040 .	12·2	11·0	90·1	1635	5·3	2·4	
MURRAYSBURG.							
SAM 767 .	12·0	10·9	90·8	1570	4·1	2·5	
ABERDEEN A.							
PEM 614 F .	14·8	10·1	68·2	2210	3·7	1·8	
	11·9	8·2	68·9	1160	4·9	2·2	
	11·2	8·0	71·4	1005	4·6	2·7	
	10·5	6·1	58·1	675	4·1	..	Anomalous.

The last specimen listed may belong to Aberdeen B, Sundays River area.

Suggestions for further Reading.

Those readers who are primarily interested in the Cape Region should now turn to the Sundays River, Gouritz Karoo (pp. 82, 92), then continue with the South Coast Region (p. 81), finishing with the Sandveld and Swartland areas (p. 106).

For those who are interested in what lies to the east, we now return once again to the Orange River, this time to the eastern end. From here we take up the south-western route where we last left it, at Smithfield (p. 60).

Eastern Province of the Cape.

We now turn from the Free State, the area of highest concentration of Smithfield types, towards the south-east, to the area of the greatest efflorescence of Bushman paintings.

Many of the sites mentioned below, both in the South-Eastern Region and in the Lowlands, have been described as paintings sites by Burkitt, Hewitt, myself, and others. The fourfold association of paintings, bored stones, implement types, and skeletal material is never very clearly expressed, but the main cultures in this general

area during the Later Stone Age were Wilton and Smithfield C, both fundamentally cave cultures, and a certain quantity of Smithfield B material on surface sites. The two former are associable with paintings, though no attempt has yet been made to analyse stylistic groups in relation to deposits. The last culture mentioned is, so far as I know, not associable with any art forms in the Eastern Province of the Cape, but it can be associated with certainty with the bored stone in several instances.

The Clarke's Siding site, on Victory Farm, is referred to by Burkitt,* and by Miss Tongue † who covers much of this area in her portfolio of paintings. Additional references to the art of this part of the Cape Province can be obtained from the works of Miss D. F. Bleek, in collaboration with others.‡

I would suggest that the areas below the mountain ranges have been fed at various periods by highways which have at times crossed one another, often at right angles. One important route, from the Free State along (or more probably, over) the southern slopes of the Basutoland mountains, which fed the Northern Transkei and East London areas, is so far unknown (see pp. 75, 77).

Various types can be traced along the coast as far as the Knysna-Tzitzikamma and the Belvedere-Heidelberg (Cape) areas.

VII. SOUTH-EASTERN REGION.

This region starts at the confluence of the Seacow and Orange Rivers, at 25° E. long. It includes the stretch between the Orange and the Witteberg and Elandsberg, then continues to include the Transkei, so far as it is known. The region is dealt with in three areas: Upper Thornveld, Lower Thornveld, and Transkei. The whole Thornveld is so named as it coincides well with the southern portion of Regional Division 5: The Cape Thornveld, in the Union Year Book 22, 1941, p. 992. So far as the Upper Thornveld area is concerned the term has little real environmental value. Possibly a better term for the Upper Thornveld would have been New Hantamveld, according to the publication of Dr. E. A. Nobbs,§ which came to hand after these terms had been chosen.

* M. C. Burkitt, South Africa's Past in Stone and Paint. Cambridge, 1928.

† Helen Tongue, Bushman Paintings. Oxford, 1909.

‡ Stow and Bleek, Rock Paintings in South Africa. Methuen, 1930. Van der Riet and Bleek, More Rock Paintings in South Africa, Methuen, 1940.

§ E. A. Nobbs, Veld. Privately published. Lynedoch, Cape, 1941. Museum copy received 9th January 1942.

UTV. Upper Thornveld.

This area covers the open plains between the Orange River and the first great mountain step towards the sea, formed by the Kikvorschberg, Zuurberg, Bamboesberg, and Stormberg ranges. The country here is dry, with a summer rainfall of 10 inches to the west, increasing to 20 inches to the east, but the Orange River is easily accessible in times of drought, and is fed by winter snow and rain from the Basutoland mountains. This appears to have been the route by which the rivers to the south-east were approached, especially the Kei and Fish Rivers. It can be regarded as a fairly general "feeder" area.

i.	13·0	11·0	84·6	1860	SEFS. ii, ME. i, KTZ. i, GR. STK. i.
ii.	(14·0	8·4	60·0	1650)	PE. ii, STK. ii.
iii.	(10·7	9·1	85·0	1040)	KV. ii, SEFS. v.
iv.	(11·0	6·6	60·0	800)	PE. iv, BDV. iii.
v.	8·6	6·4	75·0	470	WV. vii, SEFS. vii, CFS. iii, KA. ii, KTZ. xiii, BH. vii.
vi.	(6·3	6·3	100·0	255)	
vii.	7·3	4·7	64·0	250	LTV. v, BDV. vi.
viii.	5·4	3·8	70·4	113	Britstown. SEFS. xii, MF. vi, KA. v, BH. xiv, STK. v.

It is worthy of note that type i is confined to the immediate neighbourhood of the Stormberg, while type vii occurs only at Colesberg, Aliwal North, and Burghersdorp. Type v is extremely persistent all through the South-Eastern Region and eventually seems to become a lowland type, though not associable with true coastal middens. Starting from the Free State, where it appears to be a fairly general form, it passes through the present area to Knysna, apparently by way of Graaff Reinet, where a single analogy is known. After Knysna it passes along the coast into the Belvedere-Heidelberg area, but gets no farther than Still Bay.

It is important to note that the Upper Thornveld feeds the Southern Transkei directly, without any types common to both passing through the Lower Thornveld.

Only two examples have a thickness between 7·0 cm. and 10·4 cm. Diameters are fairly evenly distributed from 5·0 cm. to 14·0 cm.

Colesberg.								
MMK 1304 .	5·0	3·8	76·0	95	1·8	1·1	Ss.	Hollow centre.
Naauwpoort.								
PEM 615 Q .	11·1	6·1	55·0	750	5·3	3·3		
Albert District.								
AMG 132 .	10·7	9·1	85·0	1040	4·0	2·3		
SAM Alb. .	5·7	3·6	63·1	117	3·1	1·8		

BURGHERSDORP.							
SAM 84 .	12·8	11·3	88·3	1850	2·6	..	
	14·0	8·4	60·0	1645	5·0	2·8	
TMP 1849 .	7·0	4·3	61·4	211	3·1	1·6	
SAM Kann. .	6·0	4·2	70·0	151	2·6	1·8	
84 .	5·3	3·5	66·0	99	2·3	1·5	
ALIWAL NORTH.							
ELM 50 .	12·0	11·5	95·8	1655	5·2	3·2	Dolerite.
Drennan Coll.	11·0	7·0	63·6	845	4·5	3·4	Limy Ss. Broken.
SAM 1316 .	9·0	5·6	62·6	455	4·1	2·9	
	8·0	6·8	85·0	435	2·7	..	
	7·5	5·4	72·0	305	3·0	2·2	
	6·3	6·3	100·0	255	1·8	..	Pyriform mace head.
	5·0	3·9	78·0	97	2·5	2·2	
ROSSOUW.							
Univ. Stell. .	13·4	11·1	85·4	1995	4·4	2·8	
QUEENSTOWN-DORDRECHT RD.							
ASJ 2/36 .	13·7	10·4	75·9	1950	5·0	..	
DORDRECHT.							
NMP 96 .	8·5	6·4	75·3	460	4·6	2·2	
CLARKS SIDING, DORDRECHT.							
SAM 1756 .	7·7	(5·0)	64·9	295	4·8	3·1	(See Burkitt, *op. cit.*,
	7·0	(5·0)	71·4	245	3·3	1·8	p. 138.)
	7·3	3·8	52·0	205	3·8	1·6	

LTV. LOWER THORNVELD.

This area covers the belt of high country between the south-eastern limits of the Upper Thornveld and the Winterberg range. It includes most of the Upper Fish River and Upper Kei River basins. The climate is far more agreeable here, the rainfall is between 20 and 30 inches, and this has once been excellent game country. The rivers flow regularly except in the driest months of the year, when pools are available. Types are fairly regular.

i.	(11·5	9·0	78·2	1190)	UTV. iii, BMR. ii.
ii.	10·6	8·1	76·4	910	KB. iv.
iii.	10·6	5·7	53·8	640	NV. iv.
iv.	8·5	5·6	65·9	405	WV. vii, KA. ii, KTZ. xv, EL. iii.
v.	7·0	4·7	67·1	220	UTV. vi, TV. iii, KB. vii.

Probably types i and ii are the same. This area appears to show greater affinity with the western part of the Free State than with the eastern. This suggests that Norval's Pont and Bethulie were the paths by which these types reached their present area from an origin near Koffiefontein. Only two types show any real affinity with the Upper Thornveld.

Notice the very marked gap between specimens 6·2 cm. thick and

8·0 cm. thick, and also the lack of any examples over 9·0 cm. in height. Diameters vary from 6·6 cm. to 11·8 cm.

GLEN GREY.							
SAM 3008 .	6·8	5·0	73·5	231	3·2	2·0	Smithfield B implements.
ADAMSON'S BANK, QUEENSTOWN.							
SAM 4564 .	7·3	4·6	63·0	255	3·2	1·7	
THORNEYCROFT, QUEENSTOWN.							
ELM 78 .	11·0	5·0	45·4	605	5·0	2·0	0·92 kg.
QUEENSTOWN.							
SAM 4565 .	11·8	8·9	75·4	1235	4·8	2·7	
WUA 1159 .	10·0	6·2	62·0	620	5·6	2·6	Gritstone.
SAM 4565 .	8·6	5·4	62·8	400	3·4	1·8	
TARKASTAD.							
SAM 667 .	11·2	9·0	80·3	1130	3·2	1·5	Ss.
STEYNSBURG.							
ASJ 61/36 .	11·2	8·2	73·2	1030	4·7	2·6	
,, .	10·7	8·2	76·6	940	3·7	..	
ELM 45 .	10·0	8·0	80·0	800	4·0	1·7	0·91 kg.
ASJ 61/36 .	8·8	5·9	67·0	455	3·7	2·6	
,, .	8·1	5·6	69·2	365	3·9	1·8	
,, .	7·9	5·5	69·8	345	3·5	2·1	
F. Malan .	6·6	4·1	62·1	179	3·8	1·9	
THEBUS.							
ELM 84 .	10·5	6·0	57·1	660	4·0	3·2	1·02 kg.
HOFMEYR.							
Univ. Stell. .	10·7	5·6	52·3	640	4·0	0·9	Grinder.
	9·1	5·0	55·0	415	3·8	2·7	Ss.
	8·3	5·7	68·7	395	3·3	2·1	
MIDDELBURG.							
Drennan Coll.	7·3	5·0	68·5	265	2·7	1·7	Shale.

NTK. and STK. Transkei.

Only two sites belong to the Northern Transkei, and neither of the specimens show any relationship to either the Southern Transkei or to Natal. These are listed below under their sites, but are not included in the present type averages. The Southern Transkei is related to the lower reaches of the Great Kei River, and the averages given are deduced from this area (STK.) only.

i.	(12·7	11·0	86·3	1775)	UTV. i.
ii.	13·5	7·9	59·0	1440	UTV. ii.
iii.	12·4	8·3	68·0	1265	KA. i.
iv.	9·2	7·8	84·0	675	CFS. ii.
v.	(5·4	4·0	74·3	125)	UTV. viii, KA. v, SEFS. viii.

Almost all these Southern Transkei examples lie between 7·5 and 8·5 cm. in thickness. Only three specimens lie outside this range

(types i and v). The relationship between this area, the Central Free State, and Koffiefontein A is marked, but almost all types show a relationship with the Upper Thornveld. The complete absence of any affinity with the Lower Thornveld is important. Obviously the routes passing through the Lower Thornveld missed the Southern Transkei completely.

The Northern Transkei provides a different set of problems. Presumably the routes that fed this little-known area came up the Orange River to Qacha's Nek. This question, which will be enlarged upon under Migrations, can only be cleared up in Basutoland itself, where archaeological research is at present difficult. Careful collection of material from both the Southern and the Northern Transkei should clarify the relationship between these two areas.

North (NTK.).

Thabankulu.							
TMP 7375 .	14·0	7·0	50·0	1370	5·4	2·0	
Xuka Drift.							
SI 30 . .	10·7	7·4	69·1	850	4·0	2·8	

South (STK.).

Fort Malan.							
AMG — .	4·9	3·4	59·4	82	2·0	1·8	"Choke bored."
Cathcart Downs.							
ELM 98 .	12·7	11·0	86·3	1775	5·2	3·7	2·7 kg.
100 .	13·5	8·0	50·3	1460	4·2	3·0	2·26 kg.
97 .	12·5	8·5	68·0	1330	4·5	2·5	1·8 kg. Red ss.
96 .	(8·7)	8·0	90·8	605	4·5	3·2	
Happy Valley, Cathcart.							
ELM 94 .	14·2	8·0	56·3	1615	4·0	2·7	2·27 kg.
93 .	9·2	7·5	79·0	675	3·2	2·7	0·9 kg.
Kingwilliamstown.							
Drennan Coll. .	12·7	8·4	66·1	1335	3·0	..	Dolerite.
	12·9	7·6	58·9	1265	3·9	2·1	Ss.
	11·9	7·9	66·4	1120	4·6	2·5	Pecked.
East London B.							
SAM 520 .	9·8	8·0	81·6	770	4·4	2·4	Midden site. Shale.
Debe Nek.							
ELM 44 .	9·2	7·7	83·8	650	3·5	2·2	0·91 kg.
Ballinafad, Committee's Drift.							
AMG — .	6·0	4·7	79·1	171	2·8	1·0	

We now turn along the coast to study lowland types, and the intrusive elements brought in at various points by rivers whose basins

lie partly behind the parallel rows of mountain ranges, but which debouch at points along the coast.

VIII. SOUTH-EAST LOWLANDS REGION.

This consists of the lowlands between Port Elizabeth and East London. The region is difficult to understand, but certain fairly localised areas occur, and should provide a skeleton for future research by the four museums which happen to be included in this area. One point that should certainly be watched is the distribution of types by index, those with an index below 40 per cent. being apparently coastal. Diameter too seems important. I suggested in the Preliminary Survey that there were three parts to this region: East London to the Great Fish River, where diameters between 8·5 and 12·8 cm. are met; Fish River to Sundays River, where diameters from 4·9 to 8·3 cm. and from 10·8 to 14·9 cm. are encountered; and finally in the Port Elizabeth area, where diameters lie between 8·9 and 15·2 cm. A little new evidence has changed that picture slightly, and I have been able to divide the Region into five areas, some of only slight importance and size, but all highly suggestive.

We are reaching a part of the country where we have a difficult double flow of migration. There are the feeding lines from the inland areas down the great rivers to the coast, and across these are obvious lateral movements along the coast. In this region the rivers are still more important than the coastal highways, but as we go south and west this changes, and coastal or lateral movements become more dominant than the river routes. The reason for this obviously lies in the parallel rows of mountains, enclosing narrow valleys, typical of the southernmost littoral, forming a more effective barrier between the inland plateau and the coast.

EL. East London Area.

Types here show bad grouping, but all are limited to 8·3 to 12·7 cm. in diameter, and to 3·0 to 7·5 cm. in height.

i.	11·7	7·4	63·2	1015	BMR. iv.
ii.	12·0	5·4	45·0	780	NL. ii.
iii.	(8·8	5·7	64·8	440)	LTV. iv, UTV. v.
iv.	(10·3	3·5	34·0	375)	
v.	(8·5	4·0	47·0	290)	ZMM. i.

The comparison with the single specimen from the Natal Lowlands is given for what it is worth. There is no relationship whatsoever

discernible with the neighbouring Transkeian material, which lies between Natal and East London.

Kwelegha R.							
ELM 83 .	12·0	7·5	62·5	1080	4·5	2·2	1·9 kg. Quartz.
Nahoon.							
SAM 1495 .	(12·5)	5·2	41·6	820	(4·4)	(2·2)	Midden. Fragment.
ELM 71 .	8·5	5·2	61·8	375	4·0	2·2	0·57 kg.
East London A.							
SAM — .	10·9	5·1	46·9	605	5·0	5·5	Rocklands. Sub-triangular.
ELM 34 .	10·0	4·0	40·0	400	3·0	1·2	0·57 kg. Park Gates.
Cove Rock.							
ELM 89 .	11·7	7·5	63·8	1025	4·5	3·0	1·36 kg. Dolerite.
75 .	12·7	5·0	39·2	805	3·0	2·0	
— .	8·7	4·0	45·7	305	2·7	1·2	0·45 kg. Dolerite.
Gulu River.							
ELM 107 .	11·7	6·0	51·1	820	4·5	2·5	1·14 kg. Grinder.
103 .	10·5	3·0	28·5	330	3·5	1·5	0·57 kg. Dolerite.
Fort Beaufort.							
AMG — .	10·9	7·0	64·2	830	6·6	2·7	
	11·8	4·8	40·7	670	4·0	2·0	
Uniondale, Albany.							
AMG — .	8·3	4·0	48·2	275	4·9	2·0	Shelter. Wilton layer underlying Smithfield.
Paardekraal.							
AMG 2887 .	9·2	6·3	68·5	535	1·8	2·5	Choke bored.

BMR. Bushmans River Area.

Types here are again limited in size. Diameters lie between 10·2 and 14·8 cm. and heights between 6·0 and 9·8 cm., apart from a single thick specimen which is either anomalous or an erratic from the Knysna-Tzitzikamma area.

i.	(14·9	7·2	48·3	1600)	Burghersdorp. BH. i.
ii.	12·0	9·4	78·3	1355	
iii.	(10·6	11·9	112·3	1340)	KTZ. iii.
iv.	11·7	6·0	59·0	945	Aliwal North. KTZ. vi, EL. i.
v.	10·4	7·7	74·0	835	KTZ. ix.

Further comment on this area will follow the Port Elizabeth material. There are few affinities with surrounding areas. Types ii and v here suggest a general similarity to LTV. i and ii respectively, but not close. The main affinities are with Knysna-Tzitzikamma, an area some little distance away (p. 85).

ADELAIDE.							
ELM 87 .	12·5	7·0	56·0	1095	4·0	2·2	1·47 kg.
BOTHA'S POST.							
AMG 634 .	10·6	11·9	112·3	1340	5·5	3·0	Erratic. KTZ. iii.
699 .	10·3	7·7	74·8	815	4·6	2·9	
FORT BROWN.							
AMG — .	12·3	6·9	56·1	1045	5·0	2·5	
656 .	10·5	7·7	73·3	850	5·7	3·0	
FISH RIVER.							
AMG 703 .	14·9	7·2	48·3	1600	5·2	3·5	2·0 kg.
636 .	11·7	8·9	76·1	1220	5·5	3·1	
SIDBURY.							
AMG 1568 .	11·8	9·4	80·0	1310	5·3	3·1	
ALICEDALE.							
AMG 1643 .	11·5	8·0	69·1	1060	5·4	2·0	
,, .	11·0	6·8	61·9	825	5·6	2·0	
PEM 614 Y .	11·7	6·1	52·3	835	5·8	3·2	
SANDFLATS.							
AMG 1561 .	11·7	9·7	82·9	1330	4·5	2·3	
BUSHMAN'S RIVER.							
PEM 614 B .	13·1	9·2	70·1	1580	5·2	3·5	2·0 kg.

PE. PORT ELIZABETH AREA.

A scattered and wide distribution that should react to future careful collection and association with coastal midden materials, inland caves, river sites, and so on. It is obvious that the local rivers make the picture difficult to see.

i.	(13·9	10·8	77·8	2085)	UTV. i.
ii.	13·5	7·7	57·0	1405	TK. ii, UTV. ii.
iii.	(15·2	5·3	34·7	1225)	
iv.	(10·4	6·8	65·4	735)	ZWB. iv.
v.	11·4	5·3	46·5	690	EL. ii.
vi.	(10·8	3·9	36·2	455)	EL. iv.
vii.	9·3	4·6	49·5	400	KTZ. xiii.
viii.	7·7	5·1	66·2	305	UTV. vii.
ix.	(3·3	3·5	103·1	35)	

There are general similarities to the Upper Thornveld and to East London. The link with the former is obviously by way of Cradock and the Fish River, from a common origin.

CRADOCK.						
AMG — .	13·2	7·5	56·8	1305	5·7	2·8
ASJ 4/35/2 .	9·0	4·5	50·0	365	(4·0)	2·1
4/35/— .	8·1	5·5	67·9	360	4·0	..
4/35/28 .	7·5	4·6	61·3	260	3·3	1·9

SOMERSET EAST.							
AMG 1618 .	13·9	8·5	68·3	1640	5·5	3·4	One pole flattened.
	11·0	(5·5)	50·0	665	5·0	2·5	Both poles flattened.
	9·7	4·8	49·5	455	4·4	1·9	Battered.
	7·2	4·8	66·7	250	4·5	2·0	Pecked. Grinder.
GRAHAMSTOWN.							
AMG 1580 .	14·3	10·5	73·4	2150	8·2	2·0	
NMP 100 .	10·4	6·7	64·4	720	3·4	1·9	1·3 kg.
TOOTABI.							
PEM 614 Q .	10·8	3·9	36·2	455	4·5	2·5	5·8 kg.
PORT ELIZABETH.							
AMG 630 .	13·5	11·1	82·2	2025	6·3	3·4	
HUMEWOOD, P.E.							
PEM 615 T .	13·4	7·3	54·2	1310	4·7	1·3	1·8 kg.
59 ,, .	11·3	5·0	44·0	640	4·5	2·5	Oval hole.
,, .	8·9	4·6	51·7	365	3·2	1·9	0·45 kg.
,, .	8·2	5·0	61·0	335	2·5	..	0·35 kg.
SOUTH END, P.E.							
PEM 68/ .	12·0	5·4	45·0	780	5·0	2·8	0·95 kg. 14 feet deep.
,, .	10·4	6·8	65·2	735	5·0	2·7	1·0 kg. ,,
,, .	3·2	3·3	103·1	34	2·8	1·6	0·09 kg.
CAPE RECIFE.							
PEM 614 A .	13·4	7·5	56·1	1350	4·6	2·2	
	15·2	5·3	34·7	1225	5·3	2·6	Anomalous. Angular.

The Port Elizabeth area appears to be a migrationary intrusive route from upcountry to the coast. It shows only one type similar to those from Knysna-Tzitzikamma, and, like the Sundays River route and the localised Zuney-Maitland Mines material, this area cuts off the Bushman's River types (where three averages conform to the Tzitzikamma range) from farther west. This would suggest that the Bushman's River material was later, and spread across existing populated areas to flourish again on the far side of them—presumably the spread was from BR. to KTZ., though this is by no means certain, as the opposite migration of a limited number of types would be perfectly plausible. My presumption rests upon the supposition that areas of attraction will tend to collect surrounding types early, digest and assimilate them into a secondary cultural centre, then launch them forth once again as new migrations in new patterns.

BIBLIOGRAPHY AND COMMENTS.

J. C. Rickard,* one of the most efficient archaeologists who has worked in this country, drew material from here and from East London.

* J. C. Rickard, "Notes on some Neolithic Implements from South Africa," Cambs. Antiq. Soc., Comm. V, 7, 1881, pp. 67–74.

He associated bored stones with his Earlier Midden (pottery scarce or absent) period, at a site at North End, Port Elizabeth. At East London he likewise associated a small bored stone with his Later Midden (no cutting implements, but ornamented pottery, etc.) period. This and the associated paper are valuable, and have never received the attention they have merited in this country.

ZMM. Zuney-Maitland Mines.

These few examples certainly form a series of extremely small types. Diameters lie between 5·0 and 8·0 cm. only, and the heights do not exceed 4·5 cm.

i.	(7·8	3·9	52·7	237)	KTZ. xvi, BH. xi, EL. v, TV. iii.
ii.	5·5	3·1	56·4	94	KTZ. xviii, BH. xiv, TK. v.

Possibly this area should be included in the South Coast Region, but until further material is available it may well remain in association with Port Elizabeth. Only the Knysna-Tzitzikamma and the Belvedere-Heidelberg parallels are important, East London and the Transkei less so, while the suggested parallel with the Trekveld has no real value. There appears to be no relationship with Sundays River, Tzitzikamma caves, or with Bushman's River.

Much that has been said immediately above about the Bushman's River area in relation to Port Elizabeth would probably apply here.

Zuney, Alexandria.							
Univ. Stell. .	7·5	4·4	58·9	247	3·0	1·7	
	5·6	2·6	46·0	81	2·8	0·9	Slightly oval stone.
	5·0	2·9	58·0	72	2·9	1·7	
Maitland Mines Farm.							
PEM 615/A .	7·9	3·5	46·5	218	4·1	3·1	
	5·8	3·9	66·2	131	2·5	1·3	0·17 kg.

Obviously all knob-kerrie heads—no digging stones.

IX. SOUTH COAST REGION.

Rivers are important in a somewhat different way in this region. Before they had been highways. Now they appear to be backwaters of distribution. Along the South Coast the coast provides a 300-foot shelf, rising gently from the narrow strip of sand or soil that constitutes the Middle Stone Age 20-foot raised beach. This open belt is wide enough to keep wandering peoples near the coast, and varies from 5 to 15 miles in depth. Behind it stand serried rows of mountains, two, three, or four deep, rising to heights of 5000 feet, and

dropping steeply to enclose valleys 1000 or 2000 feet above sea-level. Finally, behind all this stands the lip of the plateau starting at 3000 feet and rising slowly until 4000 feet is reached, with higher mountains standing out of the plains. The mountains thus form highly effective barriers between the inland plateau and the coast. The result of this has been that the enclosed parallel valleys are fed by T-shaped or cross-shaped streams, running from east and west, then meeting to pass southwards to the coast through some lovely entrenched valleys in the mountain ranges. Peoples seem here and there to have been caught up in the valleys of these T-streams, and types have a local distribution, only partly reflected at the coastal peneplain where the river debouches into the sea and immediately on either side (*e.g.* Grootrivier).

Added to this, the whole stretch of country from Riversdale to the Gamtoos River mouth was thickly forested before 1875 when a devastating fire denuded all but the deepest valleys from Riversdale to the Knysna River, while even across that river game was roasted where it stood. There are thus three types of environment present in a confined area—upland plain, forest, and coastal midden country. This will be referred to once again when we deal with the various areas.

SR. Sundays River Area.

This river drains the plateau country and has its sources in the Nieuwveld and Goup. In the Preliminary Survey I included the whole basin as a single area, but the Nieuwveld appears to have only one point of contact, Aberdeen district. As I explained above, the PEM 614 F series has been divided into two, and I have found it necessary to do the same with the ELM 70 specimens. The museum divides this group into 70, 70 A, and 70 B. This last has been included under the Knysna series. The series is mainly coastal midden.

i.	(9·8	7·3	74·5	700)	KTZ. ix, ZWB. iv, WV. v.
ii.	8·7	7·0	80·4	530	
iii.	8·8	5·0	56·8	390	KTZ. xiii.
iv.	(7·2	5·1	70·8	265)	UTV. vi.

Specimens are confined to heights from 4·5 to 7·5 cm., and diameters between 7·0 cm. and 10·0 cm.

Aberdeen B.

PEM 614 F .	8·9	7·5	84·3	595	4·0	2·2
	9·3	5·6	60·7	485	4·0	..
	8·5	6·4	75·3	460	4·0	2·1
	9·0	5·0	55·6	405	3·2	2·0
	8·5	4·7	55·3	340	3·8	2·2
	7·0	5·2	74·3	255	3·4	2·2

Klein Rivier A, Hankey.

ELM 70 A .	8·7	7·0	80·0	530	3·2	1·7
70 .	7·5	5·0	66·7	280	3·2	1·5

Gamtoos River, Hankey.

PEM 615 C .	9·7	7·5	77·4	705	4·4	1·6
T .	9·9	7·1	71·7	695	4·4	2·4
C .	8·9	4·5	50·5	356	2·1	1·7

Tzitzikamma and Knysna Areas.

The next two areas need a little explanation. It was pointed out earlier that before 1875 the Riversdale-Gamtoos belt was a single forest area. To-day there is a distinct change in environment at about the George-Mossel Bay line, which was absent or only slightly important to the makers of the bored stones. Types thus cut directly across present boundaries, but the wide stretch of the Knysna River seems to have provided some sort of barrier, and may be taken as a boundary between areas.

The vast numbers of specimens that have been marked "Knysna" have made it difficult to discover anything very definite about that locality. We seem to be presented with so many types that they suggest that our system has broken down, and that we are dealing with a completely haphazard distribution of types. Further analysis shows that this is not the case.

Only one mode of analytical approach can be fairly employed at present, the subtractive method, based upon our knowledge of individual sites. I have therefore subtracted the following sites from the whole, and present them as a single area, overlapping the Knysna-Tzitzikamma area:—

Assegaibos.	Robberg Caves.
Tzitzikamma Mountains.	Eastern Heads Cave.
Tzitzikamma Caves.	Heads Road.
Forest Hall Shelter.	Woodbourne.

To these I have added one example from the Tzitzikamma Middens, one from Hankey, and three from Knysna, all of which agree with the types developed from the above series.

As to the remainder, I have perforce had to group all of them together. If we had more information we should probably find that the list given above covers the cave or shelter types, while others that are represented in the Belvedere-Heidelberg area may eventually yield a Coastal Midden series and a Coastal Plain or Forest series.

This possibility should be looked for as further specimens are collected; it is discussed later under the appropriate areas.

Here we have a supreme example of the need for an exact provenance for each specimen. This area is split by gorges and divided by almost impenetrable forests, traversed only by elephant paths. It yields three distinct environmental belts, each roughly related to altitude, the 20-foot coastal belt, typified by open middens and cave middens; the forested gorges and country rising to the 300-foot level; and finally the grassy foothills immediately below the mountain ranges. This differentiation should be reflected with varying intensity from the Gamtoos to the Gouritz Rivers and perhaps farther along the coast in both directions.

GR. Grootrivier.

The Grootrivier is the western affluent of the Gamtoos River. It seems to provide a backwater where only one type occurs:

13·0	11·8	90·8	1995	KTZ. i.

This obviously links with type i from Knysna-Tzitzikamma and is probably related to examples at Port Elizabeth, Ladismith, Victoria West, and elsewhere. It suggests a movement along the valleys at the Cape, which only now and then found its way to the coast.

Willowmore.						
PEM 1429/87	13·7	11·7	85·4	2195	5·1	2·7
Fullarton.						
PEM 614 X .	12·9	11·6	90·1	2030	4·8	2·3
Miller.						
PEM 614 Z .	12·4	12·2	98·4	1875	4·3	3·8

TZC. Tzitzikamma Caves.

This area partly overlaps the Knysna-Tzitzikamma area, and enough has been said above to explain the position.

i.	11·8	4·9	41·5	680	PE. v, BH. iv.
ii.	14·0	3·4	24·5	(665)	
iii.	10·2	3·3	32·3	345	GK. v.
iv.	10·6	2·2	20·7	(245)	BH. xii.
v.	(7·5	4·5	59·0	225)	ZMM. i, SR. iv, DBV. vi.
vi.	(6·2	1·7	27·4	65)	

It will be observed that most of the indices lie below 41·0 per cent., while all specimens are less than 5·5 cm. in thickness. Only one type

runs through the Belvedere-Heidelberg area, where it is represented at the two extremes and at Mossel Bay (type TZC. i). This latter I have compared with BH. iv (11·7 × 5·4 cm.) and type TZC. iv with BH. xii (8·7 × 2·6 cm.) as I believe the BH. series to be derived from these; the larger type persists farther west as BOT. i, which suggests a coastal type.

Klein River B, Hankey.							
ELM 70 B .	13·7	3·5	25·5	(660)	3·7	3·2	0·91 kg. Limestone.
Assegaaibos.							
PEM 615/F .	12·2	5·1	41·8	760	1·8	1·6	0·77 kg. One face concave.
Tzitzikamma Mountains.							
PEM 615/O .	7·4	4·4	59·4	240	3·6	1·9	0·3 kg. With female skeleton.
	9·7	3·1	20·5	(290)	3·0	2·6	
Tzitzikamma Caves.							
PEM 1410 .	14·6	4·2	28·8	(895)	4·1	2·9	
117 .	11·1	3·0	27·1	(370)	3·8	1·7	
Tzitzikamma Middens.							
PEM 94 .	11·5	4·4	38·5	580	4·2	2·2	
Forest Hall Shelter.							
Univ. Stell. .	10·0	4·0	40·0	400	5·1	..	
Robberg Caves.							
ASJ 11/42 .	11·5	5·2	45·2	690	3·7	2·2	
	13·6	2·6	19·1	(480)	5·0	..	Irreg.
SAM 2981 .	11·0	2·3	20·9	(278)	2·0	1·1	
	11·0	2·1	19·1	(254)	2·4	2·2	
ASJ 11/42 .	10·2	2·2	21·6	(229)	5·0	3·2	Irreg.
Eastern Heads Cave.							
SAM Bain .	6·2	1·7	27·4	65	2·3	1·8	
Heads Road.							
PEM 615/P .	10·3	3·1	30·1	330	3·9	2·6	With skeletons.
Woodbourne.							
A. W. Robinson	7·6	4·6	60·5	265	3·5	2·4	Chalky limestone. Odd grooves, apparently not related to artefact.
Knysna.							
SAM 1832 .	10·5	2·0	19·0	(220)	2·0	1·0	
1114 .	12·0	5·4	45·0	780	5·1	2·7	
A. W. Robinson	12·2	4·8	39·5	715	5·7	2·1	Ss. pebble.

KTZ. Knysna-Tzitzikamma Area.

The multiplicity of types here is somewhat terrifying, but most of them are reproduced in surrounding areas, either as directly analogous

groups, or as the results of divergent copying. This area is therefore to be regarded as focal.

i.	(13·3	12·0	89·8	2120)	GR. , UTV. i.
ii.	13·2	9·0	68·2	1570	SWB. i, BH. ii, WV. iii.
iii.	(10·5	12·2	116·2	1345)	BMR. iii.
iv.	12·1	8·7	71·9	1275	SWB. ii, BH. ii.
v.	12·8	7·4	57·8	1210	PE. ii.
vi.	11·4	7·2	63·1	935	BMR. iv, EL. i.
vii.	10·2	8·7	85·3	805	BH. iii.
viii.	11·0	6·2	56·4	750	UTV. iv, NV. iv, BDV. iii.
ix.	10·0	7·4	74·0	740	SWB. iv, BMR. v.
x.	9·1	7·9	86·8	655	STK. iv.
xi.	9·2	6·6	71·7	560	BH. vi, GK. iv, BOT. ii.
xii.	10·4	4·4	42·3	480	PE. vi, BDV. v.
xiii.	8·5	6·2	72·9	450	UTV. v, BH. vii, WV. vii.
xiv.	9·3	5·0	53·8	430	PE. vii, SR. iii, BH. viii.
xv.	8·0	5·3	66·7	330	PE. viii.
xvi.	9·2	3·0	32·6	255	BH. xii.
xvii.	7·8	4·0	64·1	245	BH. xi, ZM. iv.
xviii.	(7·1	2·8	40·0	140)	CF. vi.
xix.	(4·5	3·0	66·7	61)	BH. xiv.
xx.	(5·0	1·4	28·0	35)	

Types xi and xiii are divided into two groups partly on analogy with Belvedere-Heidelberg, but also because there appears to be a double distribution presented here: one linking with the Upper Thornveld, where the distribution of type xiii was shortly discussed.

Types vii, x, xiv, xvi, and xviii all include material from the Tzitzikamma middens, and are also related to the Sundays River middens or to those of the Belvedere-Heidelberg area. I would therefore suggest that they represent a *midden* series, separable from the remainder.

Types ii, iv, and ix are related to the Zwartberg area, and so represent an *inland* series. Type i is too closely related to the Grootrivier to be mistaken. It is also an extreme type and therefore more certainly analogous. The comparison with the Upper Thornveld is not so exact, but is suggestive. Type viii is related to Nieuwveld material and is also an inland type.

Types i, iii, v, vi, ix, x are absent in area BH.; see the note given at the conclusion of the figures for the present area.

Tzitzikamma Middens.

PEM 94 . .	9·8	8·9	90·4	885	3·8	2·1	1·2 kg.
	8·8	7·5	86·4	580	3·3	..	0·8 kg.
	9·3	4·9	52·2	425	3·9	2·4	0·53 kg.
	9·2	3·3	35·5	280	4·3	2·3	
	7·2	2·4	33·4	124	1·7	..	0·18 kg.

De Poort.

ASJ 8/36 . .	12·3	8·8	71·5	1330	4·3	2·3
	11·7	8·9	76·1	1220	3·9	2·5

DE POORT—*continued.*							
ASJ 8/36 . .	11·2	7·8	69·6	980	4·4	2·9	
	11·5	7·3	63·5	965	5·0	2·5	
	9·9	8·4	84·8	825	3·9	2·1	
	11·0	6·3	57·3	760	4·3	2·4	
	9·1	5·3	58·2	440	3·3	2·3	
	7·9	6·5	82·3	405	3·5	2·9	
	9·2	4·6	50·0	390	3·8	2·6	
	8·4	5·1	60·7	360	3·7	2·0	
	8·2	4·1	50·0	275	3·0	1·9	
KNYSNA AREA.							
AMG 1578 .	13·6	12·4	91·2	2295	4·5	2·9	Pecked.
SAM 1114 .	13·0	11·5	88·5	1945	4·2	2·2	Ss. Pecked.
	12·9	9·5	73·6	1580	4·5	2·8	Ss. Pecked.
Drennan Coll. .	13·6	8·5	62·5	1570	4·1	2·7	Ss. Pecked. Slight cuts at narrower mouth.
A. W. Robinson	13·0	9·3	71·5	1570	3·8	1·8	Coarse Ss. Pecked.
	10·5	12·2	116·2	1345	4·8	2·2	Coarse Ss. Pecked.
	13·2	7·7	58·3	1340	5·5	2·7	Coarse Ss.
	12·6	8·4	66·7	1335	4·9	2·2	Coarse Ss.
SAM Bain .	13·0	7·4	56·9	1250	4·0	2·6	
A. W. Robinson	11·6	8·6	74·1	1155	5·9	2·2	Ss. Pecked.
SAM 1114 .	10·5	9·0	85·7	995	4·8	2·5	
Sharples 17 .	10·4	8·5	80·2	920	4·3	..	Pyriform mace. Hole. 5 cm. deep.
SAM 1832 .	11·3	7·1	62·8	905	3·5	1·9	
A. W. Robinson	11·5	6·8	58·3	900	4·9	2·9	Coarse Ss.
UCT 23/18 .	11·3	6·9	61·0	850	3·9	2·1	
TMP 1868 .	10·2	7·6	74·5	790	4·7	1·9	
A. W. Robinson	10·2	7·6	74·5	790	4·0	1·8	Coarse Ss.
	10·9	6·3	57·8	750	4·7	2·5	Coarse Ss.
SAM Bain .	10·0	7·5	75·0	750	4·5	2·2	
,, .	11·1	6·0	54·5	730	5·0	2·5	Coarse Ss.
SAM 1832 .	9·6	8·0	83·3	735	2·6	2·2	
UCT 23/18 .	11·0	6·0	54·5	725	3·6	2·1	
SAM 1114 .	9·4	8·0	85·1	705	4·1	2·4	
SAM Bain .	9·7	7·2	74·2	680	4·3	2·1	Coarse Ss. Pecked.
A. W. Robinson	9·7	7·2	74·2	680	4·0	2·6	Very coarse Ss.
	9·2	7·9	85·8	670	3·8	2·0	Ss.
SAM 1114 .	9·0	8·0	88·9	650	4·0	3·5	Coarse Ss.
A. W. Robinson	8·6	8·0	93·0	590	3·5	2·2	Coarse Ss.
Sharples 19 .	9·4	6·7	70·2	590	4·1	1·8	
A. W. Robinson	9·4	6·6	70·1	585	3·4	2·1	Coarse Ss.
SAM 1832 .	8·9	7·3	82·0	580	4·3	..	Coarse Ss. Pecked.
	9·9	5·4	54·5	530	4·3	..	,, ,,
SAM 1114 .	9·0	6·6	73·7	535	4·0	..	Ss. Pecked.
A. W. Robinson	9·2	6·3	68·5	535	4·1	1·8	Coarse Ss.
	10·3	4·8	46·6	510	6·2	3·2	Ss.
	10·8	4·3	40·0	500	4·2	2·0	Ss.
Sharples 5 .	9·7	5·3	54·4	500	3·6	1·8	
SAM 1114 .	10·4	4·4	42·3	475	5·4	1·8	
A. W. Robinson	9·3	5·4	58·1	465	3·9	1·8	Ss.
SAM 1114 .	8·8	5·8	65·9	450	4·0	2·6	
	8·5	6·2	72·9	450	4·5	2·1	
UCT 23 92 .	10·0	4·4	44·0	440	4·0	2·1	TM. Ss.
	9·3	5·1	54·8	440	2·9	1·9	TM. Ss.
A. W. Robinson	8·6	5·9	68·3	435	3·6	2·0	Coarse Ss.
	10·3	4·0	38·8	425	3·7	2·2	,,
	8·9	5·2	58·4	410	3·9	2·3	Coarse Ss. Pecked.

KNYSNA AREA—*continued.*							
UCT — . .	9·5	4·5	47·4	405	4·0	2·2	TM. Ss.
SAM 1635 .	9·0	5·0	55·5	405	4·4	2·4	
A. W. Robinson	9·0	4·9	54·4	400	(4·6	2·8)	Coarse Ss. Conical bore.
	(8·8)	5·3	60·2	400	3·5	2·1	Fragment. Coarse Ss.
	8·4	5·5	65·4	390	3·2	1·9	Coarse Ss.
	9·1	4·4	48·3	365	3·4	1·6	Ss.
SAM 1832 .	8·0	5·4	67·5	355	3·9	2·0	
A. W. Robinson	9·6	3·7	37·5	340	2·5	2·2	Ss. pebble.
	8·0	5·0	64·1	305	2·4	1·8	
	9·5	3·0	31·6	270	3·0	2·4	Slatey shale.
	8·0	4·1	51·2	260	3·5	1·7	Coarse Ss.
	7·6	3·8	50·0	220	2·8	1·7	Sandy shale.
SAM 1114 .	7·5	3·9	52·0	220	2·8	1·6	
	9·2	2·4	26·1	205	2·7	2·3	
Sharples 16 .	8·6	2·8	33·0	200	3·0	2·3	Broken.
A. W. Robinson	7·0	3·3	47·1	160	3·2	1·9	Ss. Grinder.
SAM 1474 .	4·5	3·0	66·7	61	1·7	0·8	Iron bored. Ss. Anomalous.
1114 .	5·0	1·6	32·0	40	2·5	1·3	
1832 .	5·0	1·2	24·0	30	2·0	1·2	
WILDERNESS.							
MMK 508 .	12·3	7·1	57·7	1075	4·4	3·2	

The South African Museum series, numbered 1833, presented by J. S. Henkel in 1915, was said by Dr. Péringuey to have come from sites "between Knysna and Plettenberg Bay." He asked Henkel for further information, but no reply was received on this question. The scatter of the various types strongly suggests a midden series.

In comparing graphs of the Knysna-Tzitzikamma and the Belvedere-Heidelberg series the following points of difference are important:—

i. None of the BH. specimens is thicker than 9·5 cm.

ii. The KTZ. shows a marked gap between 9·5 cm. and 11·5 cm. Types KTZ. i and iii are therefore absent in BH.

iii. In the BH. specimens an analogous marked gap is seen between 7·0 and 8·0 cm. in thickness.

iv. The KTZ. series shows types v, vi, ix, and x between these two limits. These are again absent in BH. They seem to have their origins to the north-east.

These points suggest strongly that the sources for KTZ. i, iii, v, vi, ix, and x were not in touch with BH. Unluckily most of these sources are not known to us with any certainty.

My thanks are due to Mr. A. W. Robinson of Plumstead for his courtesy and kindness in allowing me access to his collection and notes.

Bibliography.

There is little comment by early writers on this part of the country. Sparrman * is the only writer to mention the bored stone from anywhere in this region. He describes a chance meeting with some Bushmen in the Lange Kloof leading from George to Uniondale. "Most of these refugees carried a thick, stout staff, generally headed with a heavy gritstone of 2 lb. weight or more, rounded off, and with a hole bored through the middle of it, to increase the force of the stick for digging up roots and bulbs from the ground."

SWB. Swartberg Area.

This inland area, related to the valley between the Kammanassi and Swartberg ranges, seems to be another backwater.

i.	(13·8	9·5	68·5	1795)	KTZ. ii.
ii.	12·5	8·2	65·6	1280	KTZ. iv, BH. ii.
iii.	11·4	8·4	73·7	1090	BH. iii, NW. iii.
iv.	(10·2	7·1	70·0	730)	KTZ. ix, WV. v.

The relationship between this area and Knysna-Tzitzikamma is very evident, and helps to explain the multiplicity of types in that area. These are, of course, all inland types, and therefore provide a clue to the composition of KTZ. No examples show a thickness less than 7·0 cm., or greater than 10·0 cm. This again precludes any relationship between this series and KTZ. i and iii.

Swartberg.							
SAM 516 . .	12·3	8·5	69·1	1285	4·6	3·0	
MP . .	11·6	8·3	71·5	1120	4·2	2·1	
,, . .	10·1	7·0	69·3	715	4·3	2·2	
Vooruitzicht.							
Oudts. Mus. .	13·0	8·0	61·5	1350	4·7	2·7	
Oudtshoorn.							
PEM 614 M .	13·6	9·9	72·8	1830	5·0	2·3	Kammatie.
A. B. Pocock .	14·0	9·0	64·3	1765	4·6	3·5	
MMK 588 .	11·6	9·1	78·4	1225	5·1	2·3	Koetzee's Poort.
Oudts. Mus. .	11·0	8·0	72·7	970	4·0	..	
PEM 614 M .	10·2	7·2	70·6	740	6·3	..	
Hazenjacht.							
Oudts. Mus. .	12·0	7·9	65·8	1140	4·0	2·6	

BH. Belvedere-Heidelberg.

This area shows fundamental similarities to the Knysna-Tzitzikamma area, but other factors affect it, notably the presence of the

* Sparrman: *A Voyage to the Cape of Good Hope.* 1786. First edition, p. 328; second edition, p. 307.

Gouritz River. I have already assessed the environmental factors here, and need hardly recapitulate. The Grootrivier element is absent in this area.

i.	(15·9	6·9	43·4	1745)	BMR. i, PE. iii.
ii.	(12·6	8·7	69·9	1385)	KTZ. ii and iv, ZW. ii, WV. iii.
iii.	10·7	8·2	75·0	1000	KTZ. vii, NV. iii.
iv.	11·7	5·4	46·1	740	BOT. i (TZC. i).
v.	8·5	9·3	110·8	670	WV. vi.
vi.	(9·6	6·4	66·7	590)	BOT. ii, GK. iv, KTZ. xi.
vii.	8·7	6·3	72·4	475	KTZ. xiii, UTV. v.
viii.	9·1	4·7	51·6	390	KTZ. xiv, BOT. iv.
ix.	(7·6	6·1	80·2	350)	
x.	7·6	5·2	68·4	300	
xi.	8·1	4·3	53·1	280	WV.* viii.
xii.	8·7	2·6	30·0	200	KTZ. xv (TZC. iv).
xiii.	(7·0	3·8	54·3	186)	BOT. v.
xiv.	5·3	3·3	62·3	93	KTZ. xviii, UTV. viii.

There appear to be two main groups here, those with heights less than 7·0 cm., and those with heights greater than 8·0 cm. (types i, ii, iii, and v). These latter appear to be *inland* types. While I have added comparisons for type i, these are unsatisfactory. Affinities with the Swartberg and with the Winterveld and the Nieuwveld areas suggest that ii, iii, v, and xi are inland types. Type viii is a persistent *coastal midden* type, and appears in the Port Elizabeth, Sundays River, and Knysna areas. Type vii is also very persistent and can be traced from the Free State, through the Upper Thornveld (where the distribution is more fully given) to here. It is almost certainly a *lowland* type here, though not necessarily associable with middens. Still Bay is the last site at which it occurs, and it may be regarded as almost certainly Wilton. Type vii may be related to type vi, which occurs in the Gouritz-Karoo area and Bot River.

The gap between 7·0 cm. and 8·0 cm. in thickness is not evident in the KTZ. series. The thickest example from here is 9·6 cm. Contrast this with KTZ.

BUFFALO POINT.							
A. W. Robinson	5·1	3·8	74·5	99	2·5	..	Sandy shale.
WESTFORD, BELVEDERE.							
SAM 4895 .	(11·0)	8·4	76·4	1015	4·5	2·5	Ss.
	10·2	8·1	79·4	840	4·3	2·2	Ss.
	12·1	(5·0)	41·3	730	4·2	2·7	Bad condition.
	8·8	4·1	46·6	320	3·3	1·9	Circumference abraded TM. Ss.
	9·0	4·0	44·4	325	4·4	2·3	Ss.
OAKHURST CAVE.							
UCT — . .	9·1	9·6	105·4	795	3·5	2·6	Grave VI A.
	7·6	6·0	78·9	345	3·7	2·2	Grave X.

BERGPLAATS CAVE.							
SAM 1635 .	9·0	5·7	63·3	460	3·7	2·0	
KAAIMANS RIVER.							
SAM 1635 .	9·4	5·1	54·2	450	4·3	2·3	TMS. pebble.
LIMBERLOST, WILDERNESS.							
AMG 3001 .	9·1	2·9	31·9	240	5·1	1·9	Oval hole.
GEORGE COAST.							
TMP 9174 .	15·9	6·9	43·4	1745	6·3	2·2	
	11·1	8·2	73·8	1010	5·4	1·9	
	8·9	5·1	57·2	405	4·2	1·7	
GREAT BRAK.							
SAM 4838 .	8·6	6·4	74·0	475	3·8	1·9	
HARTENBOS.							
SAM 1635 .	7·2	5·4	75·0	280	3·6	1·5	Coastal midden.
MOSSEL BAY.							
MMK 865 .	12·8	9·2	71·9	1510	5·0	2·2	Ss.
SAM 1777 .	12·4	8·2	66·1	1260	4·6	2·2	
1635 .	10·8	8·1	75·0	945	4·0	..	
M.B. Library .	11·1	5·3	47·8	655	5·1	2·5	
	9·7	6·4	66·0	610	4·3	1·9	Pecked.
MMK 705 .	8·3	6·7	80·1	460	3·9	2·6	Ss. Squarish.
SAM 1635 .	8·7	4·4	50·6	305	3·5	..	
	7·6	5·0	65·8	290	3·2	1·7	
	8·0	5·0	62·5	325	3·5	..	
	8·2	4·5	54·8	305	3·5	..	
1586 .	8·0	4·5	56·2	290	4·5	2·4	Slightly triangular.
TMP 1853 .	8·5	2·7	31·8	195	3·9	1·6	Found at depth.
GOURITZ RIVER MOUTH.							
SAM 506 . .	9·6	6·4	66·7	590	3·7	..	
	9·4	5·2	55·3	460	3·4	1·8	
	8·4	6·5	77·3	460	4·0	..	
	9·2	4·8	55·8	405	4·5	..	
	9·2	4·1	44·5	350	5·1	1·9	
	7·0	3·8	54·3	185	2·8	..	
	5·0	2·4	48·0	60	2·0	1·2	
STILL BAY.							
HHC 1057 .	8·7	6·0	69·0	455	3·0	..	
BLOEMBOS.							
Heese Coll. 7 .	7·6	6·0	78·9	345	3·8	1·8	0·48 kg.
18 .	8·1	4·1	50·6	270	4·6	2·4	0·37 kg.
14 .	8·5	2·1	24·7	150	2·8	1·4	
10 .	5·9	(3·7)	62·7	130	3·1	1·8	0·2 kg.
9 .	5·0	3·6	72·0	90	2·0	1·1	0·14 kg.
RIVERSDALE.							
PEM 615 H .	7·4	9·4	127·2	515	4·5	2·4	
Heese Coll. 6 .	8·9	8·9	100·0	705	3·4	2·8	
HEIDELBERG.							
SAM — . .	12·0	5·6	46·7	805	5·6	..	

Bibliography.

There is little local literature of value on the bored stone, though papers by Dr. C. H. T. D. Heese are important in throwing light on associated Wilton material from Bloembos and Riversdale. The two specimens from Oakhurst are associated in Goodwin * with Smithfield B material, Grave VI A with certainty, Grave X with slightly less certainty. They are illustrated in Plate V, C (centre of picture) and Plate VI, A (left of picture).

GK. Gouritz Karoo Area.

The Gouritz River is a cross-shaped stream, draining the Little Karoo by the Touws River affluent; the Great Karoo by the Gamka River; and the Armoed valley by the Olifants tributary. It is a wide area, and therefore grouping is bad, but there is a certain unity, and types link with sites near the Gouritz mouth in the Belvedere-Heidelberg area. This is most noticeable at Bloembos. The most provoking specimens are from Bellair, they fail to link with any local types.

i.	(12·5	7·6	60·8	1285)	SWB. ii (Bellair).
ii.	(13·2	5·5	41·6	960)	(Bellair).
iii.	10·4	5·8	55·7	625	NV. iv.
iv.	(9·2	6·4	70·0	540)	BH. vi, KTZ. xi.
v.	(10·2	3·5	34·3	380)	
vi.	(7·5	6·2	82·7	355)	BH. ix.

The larger specimen from Bellair shows some resemblance to a Swartberg type, while type iii suggests an affinity with an Aberdeen specimen from the Nieuwveld area. Only one specimen (from Bellair) is thicker than 6·5 cm. The peculiar coincidence that both Bellair specimens are anomalous, though submitted at different times, probably means that they are single representatives of local and normal types not yet adequately represented from other sites.

Nelspoort.						
Sharples .						
Sharples 18 .	10·2	6·1	60·0	635	5·1	2·5
Laingsburg.						
Heese Coll. 19	9·4	6·1	64·9	540	4·9	2·5
Hex River.						
SAM 765 .	9·0	6·5	72·2	525	3·2	2·0
Anysberg.						
SAM 175 .	11·0	6·4	58·2	775	4·4	2·4

* Goodwin, "The Oakhurst Shelter," Trans. Roy. Soc. S. Afr., vol. xxv, 1938, pp. 251 and 254.

BELLAIR.							
SAM 367 .	12·5	7·6	60·8	1285	5·5	2·5	Anomalous.
178 .	13·2	5·5	41·6	960	5·0	2·4	Anomalous.
SANDFONTEIN.							
SAM 176 .	7·5	6·4	85·3	360	4·6	2·8	
BUSHMANSFONTEIN.							
SAM 180 .	10·0	5·5	55·0	550	4·0	2·2	
PRINCE ALBERT.							
SAM 694 .	10·2	3·6	35·3	375	4·4	2·8	
	7·6	6·1	80·3	350	4·6	3·0	
ARMOED, GOURITZ BASIN.							
MMK 504 .	10·6	5·8	50·3	650	5·8	2·3	
VREYERSBERG CAVE, GOURITZ R.							
HHC 1050 .	9·5	5·5	57·9	495	3·9	1·9	0·72 kg.
MELKHOUTFONTEIN, GOURITZ R.							
HHC 1055 .	10·5	3·5	33·3	385	3·9	1·9	

X. AGULHAS REGION.

This region lies east of the Hottentots Holland range and includes several wide valleys between mountains. I have divided it into three areas—West Langeberg, the Breede River, and the Bot River Valley. To the north the boundary appears to be the Keeromberg and the Langeberg as far as Heidelberg (Cape), where the coast is reached.

WL. WEST LANGEBERG.

This consists of sites surrounding the western end of the Langeberg range. It is surprising to find a mountain range forming the centre of an area, but considerable new material submitted by Mr. G. Keet, from Montagu, SAM 5018, has changed our knowledge of this area very considerably. I would like to take this opportunity to thank him for the trouble he has taken in this matter.

i.	13·0	10·8	83·1	1825	CH. ii.
ii.	(12·0	8·8	73·3	1270)	BDV. i, SV. i.
iii.	(10·0	7·7	77·0	770)	SV. iii.
iv.	11·4	4·8	42·1	625	BH. iv.
v.	12·5	3·2	25·8	510	CH. ix.
vi.	(7·5	4·9	65·4	275)	BDV. v.
vii.	(7·6	3·2	42·1	185)	
viii.	(5·9	5·0	84·8	175)	

Type i is reminiscent of the Grootrivier material, and perhaps Ladismith supplies the link here. The gap in thickness, a notable

feature, occurs between 5·0 and 7·5 cm. The greatest thickness is 11·0 cm.

WORCESTER.							
SAM Bain .	14·0	10·5	75·0	2060	5·2	2·3	
	10·0	7·7	77·0	770	4·4	..	
NMP 2631 .	11·3	5·1	45·1	640	3·8	2·1	
SAM Bain .	12·4	3·4	27·6	525	3·7	2·0	
	12·0	3·5	29·2	505	3·0	..	
246 .	7·2	4·8	66·7	250	3·7	2·3	
164 .	6·1	5·0	81·9	185	2·6	1·8	
Heese Coll. 15	7·6	3·2	42·1	185	2·7	1·4	0·28 kg.
ROBERTSON B.							
SAM Bain .	13·2	2·7	20·5	500	5·0	3·5	
MONTAGU.							
SAM 5018 .	12·7	11·1	87·4	1790	4·6	2·6	Fine shale.
	12·6	10·4	82·5	1650	4·9	2·6	Shale. Shaped.
	12·0	8·8	73·3	1270	4·4	1·9	Reddish Ss. Erratic.
	9·9	8·0	80·8	785	4·6	2·4	Ss. Shaped.
	11·5	5·1	44·4	675	4·5	..	TMSs. pebble.
	11·2	4·5	40·2	565	4·0	1·4	Shale.
	7·8	5·0	64·1	305	2·4	..	Shaped. Shale. Signs of a groove on one face, as though broken and rebored.
BARRYDALE.							
Univ. Stell. .	5·7	5·0	87·7	162	3·1	2·2	
LADISMITH.							
MMK 503 .	13·0	11·1	85·4	1875	5·3	3·0	

BDV. BREEDE VALLEY.

As is to be expected, the long wide valley of the Breede, running from Tulbagh and Ceres almost to Heidelberg, shows similarities with the West Langeberg, which forms the northern section of its catchment area for part of its length.

i.	12·8	9·0	70·3	1375	BH. ii, WL. ii, SV. i.
ii.	12·8	8·1	63·3	1330	BH. ii.
iii.	11·0	6·6	60·0	800	CH. v, SV. ii.
iv.	(9·0	7·8	86·7	630)	BOT. iii, CH. viii.
v.	10·0	4·3	43·0	430	BOT. iv, SV. vi.
vi.	7·2	4·2	48·3	220	WL. vi, BH. xii, BOT. v, CF. vi.

Types i and ii are obviously the result of divergent copying. An analogous example in the same shapes and sizes is to be seen in KTZ. ii and iv. There is a gap in thickness from 5·0 to 6·0 cm.

CERES.							
Univ. Stell. .	12·8	8·2	64·1	1345	4·4	2·2	
NMP 2585 .	11·0	6·5	60·0	785	4·1	..	
	9·2	7·9	85·9	670	4·6	2·8	
F. Malan Coll.	6·4	3·7	57·8	152	3·1	..	Ratelfontein.

GOUDINI.							
SAM Botha	13·0	8·2	63·0	1385	4·8	3·2	
	13·0	8·0	61·5	1350	5·8	2·9	
	12·3	(8·0)	65·0	1200	4·9	2·7	
	7·4	(4·5)	60·8	245	2·5	1·8	Shale. Broken.
VILLIERSDORP.							
UCT 43/14	12·3	9·0	73·2	1500	4·0	2·6	Tertiary Ss.
Univ. Stell.	11·5	6·0	52·2	795	4·0	..	
UCT 43/14	10·9	4·7	43·1	560	4·6	2·7	Surf quartzite.
	9·6	4·2	43·7	390	3·2	1·5	Ss.
	7·5	4·2	56·0	235	3·5	1·4	TMSs.
ROBERTSON A.							
SAM 395	13·5	8·8	65·2	1605	4·8	3·2	Radial cuts at one mouth.
LECHASSEUR, ROBERTSON.							
UCT 43/3	7·0	4·1	58·6	200	3·4	1·6	10 feet deep in limestone.
SWELLENDAM DIST.							
SAM 179	13·0	9·0	69·2	1520	4·8	2·5	
174	13·0	8·0	61·5	1350	4·2	2·1	
181	11·3	7·0	61·9	895	4·4	2·2	
181	10·5	7·0	66·7	770	4·0	2·2	
177	8·8	7·6	86·3	590	3·6	2·0	
179	10·0	4·0	40·0	400	3·4	2·1	
369	6·9	4·3	62·3	205	2·1	1·4	
KRUIS RIVER, HEIDELBERG.							
HHC 1051	10·0	4·5	45·0	450	4·0	2·2	Grinder.
CAPE INFANTA.							
F. Malan Coll.	4·9	4·9	100·0	118	3·3	..	Anomalous. May be a hammerstone. TMSs.

BOT. BOT RIVER VALLEY.

This little enclosed area appears to have types of its own.

i.	(12·2	5·8	47·5	865)	BH. iv, CH. vi, CF. ii, CM. vi.
ii.	10·4	6·5	62·5	705	BH. vi.
iii.	(9·1	7·1	78·3	590)	BDV. iv, CH. viii.
iv.	9·6	4·2	43·5	385	BDV. v, BH. viii.
v.	(7·4	3·8	51·3	210)	WL. vii, BDV. vi, BH. xiii, CF. vii, CM. xv.

There is a gap in thickness between 4·1 cm. and 5·7 cm. The thickest specimens measure 7·1 cm. This shows a considerable relationship with most surrounding areas, and probably represents the most important components of those nearby areas showing heights below 7·1 cm.

The midden-filled cave at Klip Kop has been described somewhat briefly by the writer.*

* Goodwin, Annals S. Afr. Museum, xxiv, 5, 1938.

CALEDON.							
SAM 786 .	11·0	6·9	62·7	835	4·5	2·5	
	10·0	6·8	68·0	680	3·8	..	
KLIP KOP CAVE, HERMANUS.							
SAM 4776	12·2	5·8	47·5	865	6·0	..	Midden associations.
Patterson	8·7	7·4	86·4	550	5·9	2·2	White Ss.
	10·4	3·9	37·5	420	3·6	2·3	Surface quartzite.
SAM 4776	9·2	3·8	41·3	320	3·9	1·6	
DIE MOND, HERMANUS.							
L. B. Goldschmidt	7·4	3·8	51·3	210	3·8	1·8	TMS. pebble, W. bank of lagoon. Midden. Erratic.
HAWSTON.							
MMK 1253	10·6	5·8	54·7	650	3·8	2·3	Ss.
KLEINMOND.							
ASJ 4/35/3	9·4	7·1	75·5	630	3·5	2·7	
	8·8	7·1	80·6	550	4·5	2·6	
BETTY'S BAY.							
Miss Pirie	9·5	4·9	52·6	445	3·8	2·0	Grinder.
HANGKLIP.							
SAM 786 .	10·2	6·4	62·7	675	3·7	..	
	9·2	4·4	47·8	370	3·3	2·5	

COMMENTARY.

Once again there is an absence of literature on the bored stone in this region. Some of the South African Museum specimens marked as from Swellendam may have come from north of the Langeberg, but those marked with farm names in addition have been correctly allocated here.

A more important difficulty arises with the medium oblate (12·5 × 3·2 cm.) group from West Langeberg area. This group depends upon material submitted by one man, J. M. Bain, who often presented accumulations of unmarked specimens to the South African Museum. These were marked "Bain, '05" or "Bain '08," and are discarded as valueless. Other examples have a district name written on them by museum authorities. Where there is positive evidence of error these have been discarded. There are, for instance, a specimen marked "Montagu," but made from Knysna district material, and a specimen marked "Cape Flats" over Bain's original allocation to Storms River, Tzitzikamma. These are both rejected as unsuitable, though the Storms River example will be made use of in a paper discussing dagga-pipes. Those typological groups that bear Bain's name are thus open to suspicion, though where the evidence is supported by other examples, they may be regarded as completely acceptable. This difficulty arises once again in the Cape Region, and should be noted.

I have drawn attention to the gap which occurs regularly in the graphical distribution in different areas. I do not know what it means, but I presume that it marks a development in the technique of boring stone. It may also help us in our knowledge of migrations. This phenomenon continues in the Cape Region.

XI. CAPE REGION.

This region is enclosed by the Hottentots Holland range and by the Drakenstein to the east, by the Olifants River range to the north-east, and probably by the Piquetberg range to the north. It thus approaches the Bokkeveld area to the north, and the Winterveld area to the north-east, but is cut off from both by the archaeologically unknown valley of the Doorn River. On the east it joins the Agulhas Region, or is cut off from it by narrow mountain ranges. The Cape Peninsula is treated as a sub-region.

We are now well within the area covered by Péringuey in his "Stone Ages of South Africa," * and the reader may turn to that volume for the chapter on the bored stone.

The materials used in this whole region consist of shales from the Malmesbury Beds, and sandstone from the Table Mountain series, and in a few instances of granites from intercalated lavas in the Malmesbury Beds. These materials seem mainly to have been used in their beach-pebble form, and this must have been a factor in the choice of size and shape. The slates and shales naturally tend to achieve flatter pebble forms than the harder and less schistose sandstones and granites. The latter rock is rare or very coarsely weathered in beach or river gravels.

In all these areas there is a marked gap either between 7·0 and 8·0 cm. in thickness, or between 9·0 cm. and 10·0 cm. This should be watched. At times this is replaced by a complete absence of types thicker than 7·0 or 9·0 cm., again suggesting that there is some importance in this gap.

CH. Cape Hinterland.

This rather confined area consists of the western slopes of the Hottentots Holland range and the areas immediately adjacent. One small sub-area, typified by a single type of small bored stone, is included here as type xii. To the west it merges with the Cape Peninsula, and is only separated from it by the low-lying sandy expanse, broken

* Annals S. Afr. Mus., viii, 1912.

here and there by granitic, Table Mountain Sandstone, or surface quartzite outcrops, that is known to-day generally as the Cape Flats. This stretch of country irked the early settlers and proved difficult to cross by ox-waggon or on foot. The 30-mile journey by perfect modern roads to-day does not in any way represent the two days' heavy walking through dune sand that originally provided a marked barrier. It is obvious that the firmer seasand on either side of the peninsula would have provided the only easy ways of access to the peninsula proper.

i.	(16·7	9·9	59·3	2760)	*Cf.* Hout Bay. ? MaNtatisi.
ii.	12·8	10·3	80·4	1690	WL. i.
iii.	12·2	7·4	60·6	1010	GK. i, BV. ii, CM. iii.
iv.	11·0	7·9	71·8	965	BH. iii, CF. i.
v.	11·0	6·8	61·8	825	BDV. iii, CM. vii, BOT. ii.
vi.	(11·9	5·7	47·9	810)	BH. iv, BOT. i, CF. ii, CM. vi.
vii.	(12·7	4·3	33·8	695)	Anomalous.
viii.	9·3	7·5	80·6	650	BDV. iv, BOT. iii.
ix.	9·7	5·1	52·6	480	
x.	9·1	5·8	63·7	480	GK. iv, CM. xi.
xi.	8·2	6·0	73·2	405	GK. v, CM. xii.
xii.	8·2	4·3	51·8	285	BH. xi.
xiii.	(4·0	2·4	60·0	38)	

Type xii is local, and occurs in Ida's Valley (Stellenbosch), at Vlottenberg and Somerset Strand only. It is absent at Kogel Bay and from the far more representative series from Gordon's Bay. Types iv and v are a pair, and type viii may eventually yield to subdivision. There is a marked gap between types ii and iii.

Major Jardine's collection, marked as from Gordon's Bay, is partly from his farm, "Applegarth," situated immediately north of Sir Lowry's Pass on the western slope of the Hottentots Holland. It is thus within four or five miles of Gordon's Bay, but does not necessarily consist of midden types. All other materials from Gordon's Bay are from midden sites which show no formal implements. Pottery occurs on the recent surfaces only and is absent from most middens. My thanks are due to Major Jardine for his courtesy in permitting me to make use of his material.

There is a complete absence of types between 8·6 and 9·6 cm. in thickness.

Helderberg.							
UCT 44/1 .	4·0	2·4	60·0	38	1·9	1·1	Extremely small.
Stellenbosch.							
AMG 1549 .	16·7	9·9	59·3	2760	5·3	2·8	Compare Hout Bay.
UCT 27/10 .	12·0	11·0	91·7	1585	3·3	1·6	Probably metal bored.
SAM 3428 .	11·0	7·6	69·0	920	4·0	..	TMSs. pebble.

STELLENBOSCH—*continued.*							
SAM 4959 .	10·7	6·7	62·6	770	4·1	1·9	Gustrouw.
3428 .	9·2	5·6	60·8	475	3·7	2·8	
UCT 27/15 .	8·2	6·2	75·6	415	3·9	2·1	TMSs. pebble.
43/20 .	9·5	5·1	53·4	460	3·8	2·0	TMS.
IDA'S VALLEY.							
SAM — .	8·1	4·1	50·7	270	3·0	2·0	
VLOTTENBERG.							
UCT 44/3 .	12·3	7·2	58·5	1090	4·2	2·1	Used as hammer.
Univ. Stell. .	8·4	4·5	53·6	320	3·2	2·9	
SOMERSET STRAND A.							
SAM — .	8·2	4·0	48·8	270	3·7	1·7	
GORDON'S BAY.							
Jardine Coll. .	13·4	9·6	71·6	1725	3·0	. .	
	12·4	7·8	62·9	1200	4·1	. .	
	12·3	7·2	58·5	1090	3·8	3·2	
SAM 1775 .	11·8	7·4	62·7	1020	5·4	. .	
Jardine Coll. .	11·1	7·9	71·2	975	3·8	2·2	
	10·8	8·2	75·9	960	2·9	. .	
	12·7	5·8	45·0	925	(4·5 ×	2·5)	Oval, tubular hole.
	10·8	7·6	70·4	885	4·1	2·1	
	11·1	7·0	63·1	860	4·1	2·0	
Univ. Stell. .	11·0	7·1	64·5	860	4·3	3·0	
Jardine Coll. .	11·4	6·6	57·9	855	3·8	2·1	
UCT 43/21 .	11·1	6·7	60·0	825	5·3	2·7	Grinder. TMS.
Jardine Coll. .	11·9	5·7	47·9	810	5·1	2·5	
	10·5	6·5	61·9	715	4·3	2·7	
Univ. Stell. .	(9·1)	8·6	(94·5)	710	4·0	2·0	Coarse Ss.
AMG 1646 .	12·7	4·3	33·8	695	5·0	2·3	
Jardine Coll. .	9·8	7·0	71·4	670	2·9	1·9	
	9·2	7·6	82·6	645	7·0	1·1	
	9·2	7·5	81·5	635	3·5	. .	
UCT — .	9·4	7·0	74·4	620	4·2	. .	
Jardine Coll. .	10·0	5·2	52·0	520	3·8	2·5	
Univ. Stell. .	(9·3)	6·0	64·5	520	3·8	3·5	
	8·3	6·6	80·0	455	3·5	. .	
Jardine Coll. .	8·9	5·5	61·8	435	3·8	2·2	
SAM 1775 .	8·4	6·0	71·4	425	. .	. .	Both holes started.
	8·4	5·4	64·3	380	3·9	3·6	
KOGEL BAY, MIDDENS.							
WUA 254 .	13·0	10·3	78·5	1740	4·4	1·3	2·3 kg. Surf quartz.
256 .	9·0	5·9	65·6	480	4·0	2·3	Calcareous Ss.

CAPE PENINSULA SUB-REGION.

Just as it was found possible to suggest the presence of various cultural groups in the Knysna-Tzitzikamma and Belvedere-Heidelberg areas, so we find that the Cape Peninsula provided a focus of attraction for various peoples. Here too the country was at one time heavily wooded, as such names as Hout Bay, Rondedoornbosjen, etc., would imply, and we do not get a true picture of the prehistoric scene among to-days' oak and pine forests. From Constantia Nek to Hout Bay was

a single forest of mixed type. The same was true of Tamboer's Kloof above Cape Town. To reach Simonstown, van der Stel was forced to hack his way through thick natural scrub and bush, forming a thick talus growth typical of both sides of the Peninsula. The Fish Hoek valley, cutting through the mountains to Noordhoek, was a mass of low trees, 6 feet in height, forming a natural warren of sheltered paths or run-ways, 4 feet high.

In contrast to this picture of wooded valleys and mountain slopes, the Cape Flats appear to have been more bare than they are to-day. Peaty deposits show that this area was dotted with undrained fresh-water vleis or springs, often almost at sea-level. These were bordered by water-loving reeds and grass, giving way to the ubiquitous white sand.

The Peninsula therefore provided a wide ecological range for man, and must have attracted a variety of cultural groups. Some of these appear to have clung to the eastern slopes of the mountains and to have made use of the vleis and springs of the Cape Flats proper. Others passed over the first range of mountains to the Fish Hoek-Noordhoek valley, while only a few crossed to Simonstown and the treeless area about Cape Point.

The Peninsula is here dealt with in two sections: the Cape Flats and the Cape Middens. These two would seem to be partly cultural and partly distributional groups. If the two sections are plotted on a graph paper as one it is obvious that nothing can be made of local types. If, however, we group together known midden material and specimens from the mountain slopes immediately overlooking the coast, and contrast this with the distribution of Cape Flats types, a very clear difference appears, and only slight adjustment of specimens from uncertain sites becomes necessary.

The attractions of these two environments with their different modes of life are obvious. In the midden cultures we have an environment with abundant supplies of lime, fish foods, iodine, salt and kelps, all with a high nutritive content, sufficient in itself to account for the regularly taller stature of the coastal midden peoples leading a strandloper mode of life. On the Flats, in contrast to this, we have an environment with a natural fauna of hippo and ungulate types, and abundant wild water-uintjes,* which must have supplied a source of essential vegetable foods at that time, just as it does to a section of the Cape coloured community to-day.

In the Preliminary Survey the Cape Middens material was referred

* *Aponogeton distachyon.*

to as the Cape Mountains area. I have changed this as the original term was misleading; there are few examples known from heights greater than 500 feet above sea-level, while those that occur on lower mountain slopes are related in almost all instances to midden deposits. The sites not relatable to midden deposits are added at the end of the main list.

CF. Cape Flats.

The term Cape Flats was fairly generally applied fifty years ago to the low-lying sanddune country immediately to the east of Claremont, Wynberg, and Plumstead. To-day the term has a wider meaning, but we can generally refer all the material so marked to that older and more confined stretch. One specimen, presented by J. M. Bain, is marked "Cape Flats", but is almost certainly an erratic related to types from Kloof, etc., in the Middens series. It is therefore listed under Cape Middens. An exactly analogous case is a specimen marked SAM 402, also presented to the South African Museum as being from the Cape Flats.

The normal routes from the mainland of South Africa to the Peninsula were along the Table Bay or the False Bay beaches of hard, wet sand rather than across the Flats. This would account for the present area being isolated from the Cape Middens area, which is connected with sites on the Table Bay side, and with the Cape Hinterland.

The natural False Bay coastal road leaves the heavy sand at Somerset Strand, thus accounting for the Somerset Strand B material that resembles Cape Flats rather than Hinterland types. The following types should therefore prove to be typical of both the Cape Flats and the False Bay coast, and seem to represent migrations between BH., WL., BOT. on the one hand, and CF. on the other.

i.	10·9	7·4	67·8	865	CH. iv, v.
ii.	11·4	5·7	50·0	740	CM. vii.
iii.	(11·6	3·1	26·7	415)	WL. v.
iv.	7·7	5·5	71·4	325	BH. x.
v.	6·8	4·4	64·8	205	BDV. vi.
vi.	7·4	3·2	45·9	175	BOT. v, WL. vii.

There appear to be no specimens thicker than 7·5 cm., while diameter varies from 6·5 to 12·0 cm.

Somerset Strand B.

UCT 43/22 .	7·9	5·7	72·2	355	4·0	2·9
44/2 .	6·7	4·6	68·7	207	3·0	..

Diep River.

SAM — .	11·0	7·4	67·2	895	4·2	3·5

CAPE FLATS.							
SAM Bain .	12·0	6·5	54·2	935	4·7	2·5	
692 .	11·5	7·0	60·4	925	4·6	4·0	
	10·8	7·5	69·4	875	4·0	2·8	
Bain .	11·8	6·0	50·8	835	3·5	2·5	
„ .	11·0	5·6	50·9	680	4·5	3·2	Non-radial cuts at mouth.
„ .	11·8	2·8	23·8	(390)	3·8	3·0	
„ .	7·0	4·6	65·7	225	3·0	2·2	
„ .	7·0	2·6	37·1	127	3·4	2·0	
PHILIPPI.							
Drennan Coll.	6·7	4·1	61·0	184	3·8	1·7	
VICTORIA HOSPITAL.							
ASJ —. .	11·0	(7·5)	(68·3)	905	3·5	2·3	
	7·7	5·5	71·4	330	3·9	2·0	
	7·5	3·5	46·7	197	3·1	1·7	
UCT 30/21 .	7·3	3·5	47·9	187	3·2	2·0	One face ground.
PINELANDS.							
Jager Coll. .	10·0	7·4	74·0	740	3·2	1·7	Ss.
EERSTE RIVIER.							
F. Malan Coll.	11·3	5·8	51·3	740	4·7	3·1	
CONSTANTIA VALLEY.							
TMP 2334 .	11·4	3·3	28·9	(429)	4·3	2·3	

CM. CAPE MIDDENS.

It is obvious that the Peninsula as a whole was a pocket, an ethnological marginal area, into which any passing culture might throw off groups which would remain isolated in their new home. It is to be expected therefore that we will find a multiplicity of types. Some of these have gone farther afield than others, only one type of stone reached Cape Point, while only three types occur at Simonstown. South of the Fish Hoek-Noordhoek valley the marginal effect is to localise and isolate types, while north of that line its effect is to catch and hold a multiplicity of passing types from a variety of sources.

But that alone would not account for all the types. Some may prove to be pairs, due to divergent copying. For instance, types ii and iv seem to be related.

It is to be noted that the first of the Groote Schuur specimens does not fit comfortably into this distribution, nor into the Cape Flats distributions. It is, however, added here.

i.	(16·0	10·5	65·7	2690)	Hout Bay only. CH. i.
ii.	(12·9	8·7	67·4	1445)	
iii.	12·4	7·4	60·0	1140	BDV. ii, CH. iii.
iv.	11·4	8·5	74·5	1105	ZW. iii, BH. iii.
v.	(13·7	5·1	37·3	955)	
vi.	12·2	5·7	46·7	850	BOT. i, CH. vi.

vii.	10·5	7·0	66·7	770	BDV. iii, CH. v.
viii.	9·1	8·4	92·3	695	CH. viii.
ix.	10·4	5·8	55·8	625	
x.	11·2	4·8	42·8	600	WL. iv.
xi.	9·0	5·4	60·0	435	CH. ix.
xii.	(8·3	6·2	75·0	430)	CH. xi.
xiii.	(7·0	7·1	101·4	350)	
xiv.	9·0	3·5	39·1	285	BOT. iv, SV. vi.
xv.	7·8	3·6	46·2	220	BOT. v, WL. vii, CH. xii.
xvi.	(10·2	2·0	19·6	208)	

Shows a close relationship to the Cape Hinterland area. There is a distinct gap in thicknesses, from 9·0 cm. to 10·5 cm., and only one specimen occurs in this latter thickness, the Hout Bay example. The connection of this area, through Darling, Tygerberg, and Blaauwberg, with the natural route along the hard sands of Table Bay is obvious. A similar hard route along the beach links the Hinterland and the Middens area.

DARLING.							
MMK 282/a .	10·8	8·7	80·5	1015	4·2	2·0	Coarse Ss.
	13·7	5·3	38·0	995	3·9	2·4	Ss.
	11·5	5·0	43·5	660	6·0	2·4	Irregular pebble.
TYGERBERG.							
SAM 5001 .	9·3	3·3	35·5	285	3·3	2·2	
BLAAUWBERG.							
SAM '09 . .	12·0	8·2	68·3	1180	5·0	2·2	
GREEN POINT.							
SAM Péringuey	11·6	8·4	72·4	1130	4·2	3·3	3 feet 4 inches below surface.
	10·2	2·0	19·6	(208)	4·2	3·4	Slate.
STRAND ST.							
UCT 43/18 .	10·1	5·5	54·5	560	4·1	2·2	30 feet deep in foundations.
PARLIAMENT FOUNDATIONS.							
SAM 0/11 .	12·1	5·7	47·1	835	4·9	2·4	
KLOOF.							
SAM 5002 .	7·8	3·8	48·7	231	4·1	2·7	
HOUT BAY.							
UCT 27/18 .	16·0	10·5	65·7	2690	1·9	1·0	Malmesbury shale. Metal bored.
	11·9	7·4	62·2	1045	5·9	3·1	
SAM 4750 .	12·5	5·7	45·6	895	5·1	..	
4777 .	9·2	8·1	88·0	685	3·6	2·1	
WUA 1182 .	10·6	7·2	68·0	585	4·3	..	
SAM 4777 .	9·1	5·6	61·5	465	4·1	2·3	
UCT 27/18 .	8·3	6·3	75·9	435	3·9	2·9	
SAM 4777 .	8·3	6·2	74·7	430	4·1	3·1	
	7·0	7·1	101·4	350	4·1	..	
UCT 27/18 .	9·3	(4·0)	43·0	345	3·2	1·8	

NOORDHOEK.							
UCT 30/13 .	8·5	8·9	104·7	645	3·9	2·7	
SAM 1287 .	9·2	6·0	65·2	510	3·8	3·4	
UCT 30/13 .	10·5	4·4	41·9	485	3·0	2·7	Malmesbury shale.
KOMMETJE.							
SAM 3831 .	11·0	6·8	61·8	825	4·5	..	
	10·5	6·2	59·0	685	4·0	2·4	
Univ. Stell. .	8·4	5·2	62·0	365	3·4	2·5	Shale.
CAPE POINT.							
SAM Martin .	9·0	3·8	42·2	310	4·6	..	
	8·1	3·8	46·9	250	3·8	2·4	
	8·5	3·1	37·6	214	3·9	2·2	
SIMONSTOWN.							
SAM Martin .	9·7	8·1	84·0	760	4·2	2·6	Two faces ground.
	10·2	7·0	68·6	730	5·0	2·5	0·96 kg.
	10·3	6·1	59·2	645	4·7	2·1	0·77 kg.
	9·4	5·4	57·4	480	4·0	..	
	10·0	6·0	60·0	600	4·5	3·5	Broken, rebored at right angles, then rebored again with a larger rimer, leaving part of the narrower bore still visible down the side of the new.
FISH HOEK.							
SAM 1287 .	12·0	7·4	61·7	1065	5·0	0·7	
	12·0	5·6	47·3	805	5·0	2·4	
Jager Coll. .	12·0	4·9	40·8	705	3·9	2·7	Irregular. Grinder.
SAM — . .	10·3	5·8	56·3	610	3·5	2·3	
Drennan Coll. .	11·0	4·5	40·9	545	3·1	2·0	Shale.
J. Gordon Coll..	8·7	4·5	51·7	340	4·0	2·6	TMS.
SAM (Peers) .	8·0	3·4	40·5	330	3·9	2·5	Slate.
SAM — . .	7·5	3·6	48·0	205	3·0	2·0	
PEERS' CAVE.							
SAM (Peers) .	11·2	5·1	45·5	640	4·3	1·8	Ss. Midden deposit.
CLOVELLY.							
Drennan Coll. .	10·9	8·4	77·1	1000	3·8	2·2	Symmetrical bore.
ST. JAMES.							
UCT 30/28 .	13·0	7·1	54·6	1200	4·8	2·9	
MUIZENBERG.							
UCT 43/23 .	9·0	5·0	55·6	405	3·8	1·9	TMSs.

NON-MIDDEN SITES.

GROOTE SCHUUR.							
SAM 4362 .	12·9	8·7	67·4	1445	5·3	2·3	4 feet below surface. UCT.
TMP 2354 .	10·8	5·4	50·0	640	4·5	4·2	3 feet deep. Lion's den. Zoo.
(M. C. Burkitt .	9·3	5·3	57·0	460	5·2	2·5)	Estimated from illustration. UCT building site.

CONSTANTIA NEK.							
Jager Coll. .	12·5	7·6	60·8	1190	5·5	3·7	
WETTON FLATS.							
G. A. L. Green Coll.	13·7	4·8	35·0	900	4·3	1·7	Ss.
,, ,,	8·7	3·4	25·6	255	4·2	..	Malmesbury. Ss.
CAPE FLATS.							
SAM 402 . .	11·0	4·8	43·6	580	4·9	2·8	
Bain .	9·5	3·6	37·8	325	4·0	3·5	Almost cylindrical bore.

COMMENTARY.

Of these types only one (the slate example from Green Point), type xvi, does not appear to have crossed the mountains. It may or may not be related to type iii from the Cape Flats, but it is certainly a product of the material used. In contrast types viii, ix, and xi are the only ones that reached as far as Simonstown, and only type xiv managed to traverse the length of the Peninsula to the Cape of Good Hope. This is the type of distribution that would be expected on a peninsula. Types i, x, xii, and xiii seem to be confined to the Fish Hoek-Noordhoek valley and to Hout Bay. This at first seems surprising, as Chapman's Peak stands across the present coastal road between Hout Bay and Noordhoek as an almost sheer cliff, 1500 feet high. In practice the footway passing behind the peak through the Silvermine Valley is an easy walk and also provides access to the Tokai portion of the Constantia valley, from where I have no specimens. This footpath was in fact the only wagon-road to the Cape of Good Hope two centuries ago. Type viii is confined to this same area and to Simonstown, so far as our evidence goes.

This mountainous area shows the possibilities which may be brought out by careful use of the distributional method. In this last area alone, five possible cultural waves may be recognized, the least adventurous reaching only to the Constantia Valley and the northern slopes of the mountains. The Hout Bay-Fish Hoek group provides a second wave; a third seems to have been more general in its distribution; the fourth reached the enclosed bay at Simonstown; while the most adventurous passed even farther south to Cape Point. We have not an iota of evidence to give us any clue as to the order in which these presumed spreads occurred, but the evidence of distribution does supply us with an important new source of material for future research workers. With increasing evidence from various areas, museum and field workers now have a new methodological tool.

We now return to the Cape Region proper.

SV. Sandveld.

This covers the inland stretch from Wellington to Clanwilliam. Some of the groups are wide and therefore unsatisfactory, but more material should yield a better approximation. It is a fertile, low-lying downs country, and seems never to have consisted of anything except open grassland, with a scrub flora in the valleys. In late Quaternary times the fauna seems to have included such plains-loving forms as *Bubalus bainii* and *Equus capensis*, pointing to an environment much the same as that encountered to-day.

i.	12·0	9·2	76·7	1325	WL. ii, BDV. i.
ii.	11·7	6·6	56·4	905	CF. ii, BDV. iii.
iii.	(10·4	8·0	77·0	865)	WL. iii, BH. iii.
iv.	11·4	3·9	34·2	510	CF. iii.
v.	8·9	5·7	64·0	450	CH. ix, CM. xi.
vi.	9·0	3·8	42·2	310	BOT. iv, CM. xiv, BDV. v.
vii.	(8·4	2·3	27·4	160)	BH. xii.
viii.	5·8	3·1	51·7	105	BH. xiv.

Shows considerable affinity with Breede River and West Langeberg. No specimens thicker than 9·5 cm. thick.

Clanwilliam A.							
SAM Bain .	13·2	8·7	65·9	1525	4·1	2·6	
	12·0	9·2	76·7	1325	4·4	3·1	
	10·6	9·5	89·6	1070	4·2	2·6	
	11·9	7·0	58·8	990	4·1	2·1	
Clanwilliam B.							
SAM 1120 .	10·0	8·3	83·0	830	4·5	3·8	
	12·0	4·5	37·5	650	4·2	2·1	
	8·5	5·4	63·5	390	3·0	2·2	
Olifants River.							
SAM 420 . .	10·0	5·5	55·0	550	4·5	..	
	9·0	6·0	66·7	485	3·5	2·0	
Sandkraal.							
F. Malan Coll. .	10·7	7·6	71·0	870	4·6	3·8	Reddish sandy shale. Ochre on one side. Signs of sharpening.
Elands Kloof, Tulbagh.							
NMP 2578 .	11·2	6·4	57·1	805	4·0	2·2	
2584 .	10·3	3·0	29·1	320	2·8	1·8	
Moorreesburg.							
SAM Bain .	12·0	6·4	53·3	920	4·0	2·2	
710 . .	11·2	3·8	33·9	475	3·5	3·0	
	7·6	5·8	76·3	335	2·1	..	
	8·2	3·3	40·2	222	2·5	1·9	
Bain's Kloof.							
SAM — . .	8·4	(2·2)	(26·3)	155	(2·7)	1·9	Fragment.
Goedhoop, Wellington.							
F. Malan Coll. .	9·3	5·9	63·4	510	4·3	2·6	

WELLINGTON.							
SAM 3425 .	11·6	6·5	56·0	875	5·8	..	
	9·0	3·8	42·2	310	3·0	1·9	
	6·4	3·0	46·8	123	3·1	2·1	
OLYVENBOSCH, WELLINGTON.							
F. Malan . .	12·2	6·7	54·1	1000	5·2	2·5	Malmesbury shale.
NABYGELEGEN, WELLINGTON.							
F. Malan Coll. .	5·9	3·5	59·3	122	2·7	1·5	
	5·0	2·3	46·0	59	3·0	1·4	
GROENVLEI, WELLINGTON.							
F. Malan Coll. .	12·2	4·3	35·2	640	3·2	2·1	TMSs.
	9·9	4·4	44·4	430	4·7	3·4	TMSs.

SWL. SWARTLAND.

Apart from a specimen with Wilton associations, a single type appears to cover the coastward stretch between Saldanha Bay and Parow. Probably the distribution will be found to approximate to a coastal midden people. Its importance (like that of the Grootrivier type) lies in its localisation and in the uniformity of size.

i.	14·3	7·4	51·0	1520	No parallels known.
ii.	(10·3	6·8	66·0	720)	CM. vii, BOT. ii, CH. v.

Type i shows no relationship with any surrounding types, but type ii suggests relationship with the Cape Middens material. The nearest affinity to type i is in the Southern Transkei, with no intervening links.

GEELBEK, SALDANHA.							
L. B. Goldschmidt	13·8	7·2	52·2	1370	3·6	2·4	TMS.
KLIPVLEI, SALDANHA.							
P. Bateman .	10·3	6·8	66·0	720	3·8	2·5	TMS. Shale contact. Wilton site.
MALMESBURY.							
F. Malan Coll. .	14·7	7·0	47·6	1515	3·9	2·5	Malmesbury shale.
YZERFONTEIN POINT.							
SAM 4997 .	14·2	7·6	53·7	1530	4·1	2·2	
KLIPKOP, PAROW.							
SAM 5006 .	14·3	7·6	53·1	1555	4·2	3·8	Shale. Cylindrical bore.

While nothing is known of the Wupperthal area, Sir Langham Dale,* writing in 1870, says: "From Wupperthal I hear that oval perforated stones were used by the old Hottentot warriors as weapons of war, a stick of hard wood was thrust into the hole. For digging up roots the stone was grasped in the hand, the end of the stick being sharpened for picking up the ground."

* Δ (Delta) "Stone Implements in South Africa," Cape Monthly Mag., New Series, i, 1870, pp. 236–239, illustrated.

Conclusions.

These two parts have been designed to bring out the following premises:—

I. Identity of intention. It was intended to produce a limited number of types of bored stone.

II. There is no reason to believe that any one cultural group used more than two or three of these types in any one area and at one period.

III. Dissimilarity is due to inexact methods of achieving identity. The approximation is generally sufficient to show a clear graphical scatter (except in the focal areas), but seldom sufficient to yield exact replication.

IV. This led to an eventual multiplication of types (most marked in the focal areas), in some instances approximating to previous types.

V. Only certain of these new developed types occur in new migrations, when the whole process above is repeated.

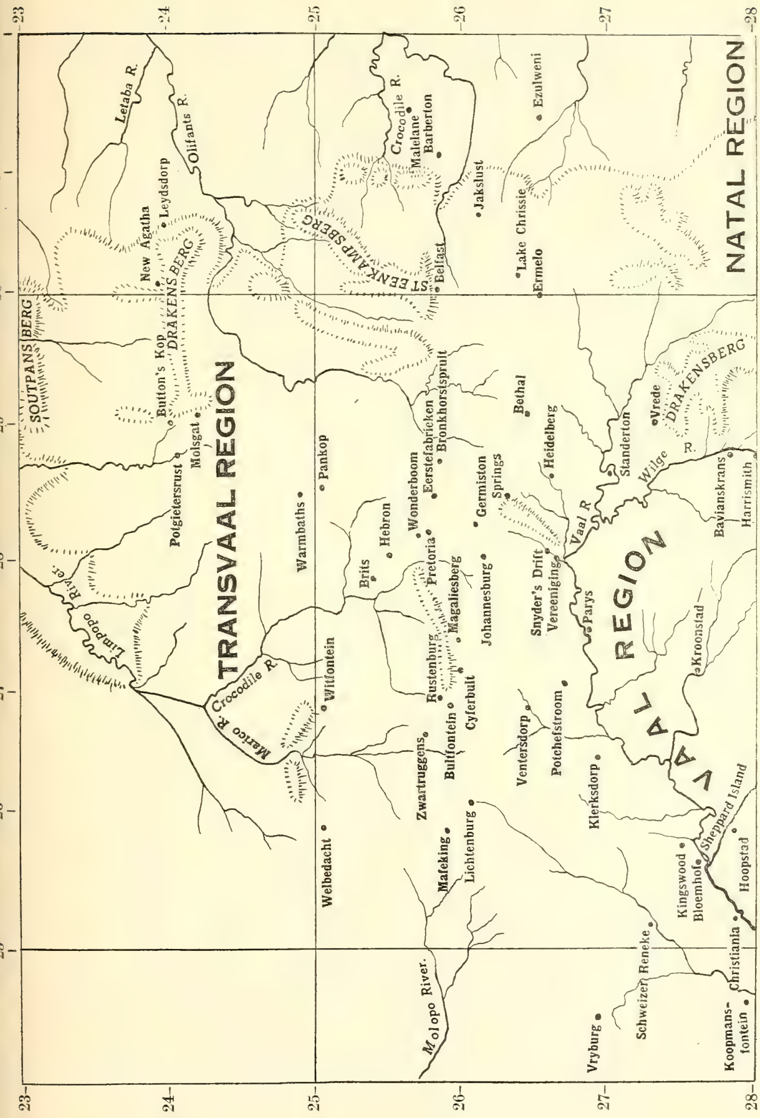
VI. The numbers of anomalous specimens are small enough in most areas to be negligible, and to permit us to presume that they were rare individualist products.

We can conclude from these six premises that it should be possible to trace migrational routes from one focal area to another by means of a study of types. It is not possible, however (by reasons given as premises iii, iv, and v), to study the distribution of any one type throughout the entire area considered.

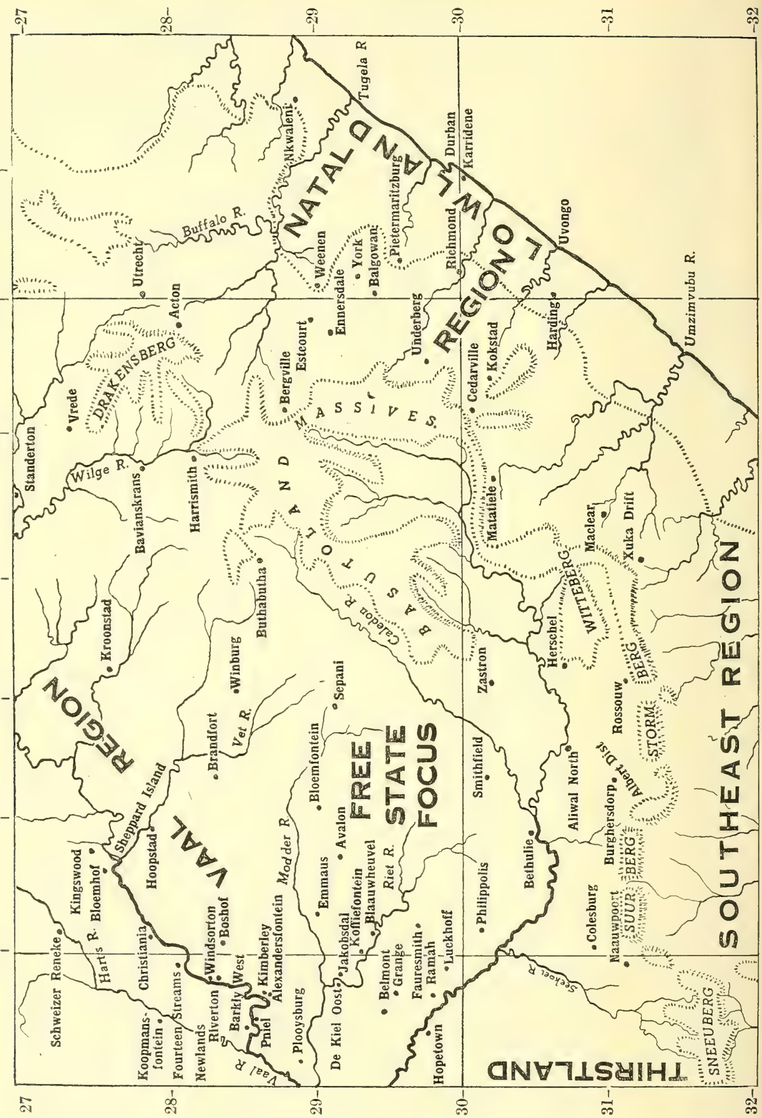
Not one of these premises would seem to apply to the Transvaal Bantu bored stones.

Key and Index to Areas (Circular Specimens).

		PAGE			PAGE
BDV.	Breede Valley.	94	NG.	Nieuveld-Goup.	70
BH.	Belvedere-Heidelberg.	89	NH.	Natal Highlands.	31
BMR.	Bushmans River.	78	NL.	Natal Lowlands.	33
BOT.	Bot River.	95	NQL.	Namaqualand.	66
BS.	Bloemfontein-Sepani.	39	NTK.	Northern Transkei.	75
BV.	Bokkeveld.	64	PE.	Port Elizabeth.	79
CF.	Cape Flats.	101	SCV.	Schoonspruit-Vaal.	36
CFS.	Central Free State.	52	SEFS.	South-Eastern Free State.	54
CH.	Cape Hinterland.	97	SR.	Sundays River.	82
CM.	Cape Middens.	102	ST.	Southern Transvaal.	29
CT.	Central Transvaal.	26	STK.	Southern Transkei.	75
EL.	East London.	77	SV.	Sandveld.	106
ET.	Eastern Transvaal.	25	SWB.	Swartberg.	89
GK.	Gouritz-Karoo.	92	SWL.	Swartland.	107
GR.	Grootrivier.	84	TV.	Trekveld.	69
KA. KB.	Koffiefontein.	48	TZC.	Tzitzikamma Caves.	84
KTZ.	Knysna-Tzitzikamma.	85	UH.	Upington-Hartbees.	62
KV.	Kaaienveld.	65	UTV.	Upper Thornveld.	73
LTV.	Lower Thornveld.	74	VH.	Vaal-Harts.	41
LV.	Lower Vaal.	44	VMR.	Vet-Marico Rivers.	37
MF.	Modder-Fauresmith.	53	WL.	West Langeberg.	93
MG.	Molopo-Groenwater.	61	WV.	Winterveld.	67
MV.	Middle Vaal.	42	ZMM.	Zuney-Maitland Mines.	81


TRANSVAAL REGION
VAAL REGION
NATAL REGION
SOUTPANS BERG
DRAKENSBERG
STEENKAMPSBERG
Letaba R.
Olifants R.
Crocodile R.
Limpopo River.
Marico R.
Molopo River.
Vaal R.
Wilge R.
New Agatha
Leydsdorp
Button's Kop
Molsgat
Potgietersrust
Warmbaths
Pankop
Witfontein
Malelane
Barberton
Jakslust
Ezulweni
Lake Chrissie
Ermelo
Belfast
Bronkhorstspruit
Eerstefabricken
Wonderboom
Pretoria
Hebron
Brits
Magaliesberg
Rustenburg
Bultfontein
Cyferbult
Zwartruggens
Welbedacht
Mafeking
Lichtenburg
Germiston
Johannesburg
Springs
Bethal
Heidelberg
Standerton
Vrede
Bavianskrans
Harrismith
Snyder's Drift
Vereeniging
Parys
Potchefstroom
Ventersdorp
Klerksdorp
Kroonstad
Sheppard Island
Kingswood
Bloemhof
Hoopstad
Schweizer Reneke
Christiania
Koopmans-fontein
Vryburg

Map I.



27
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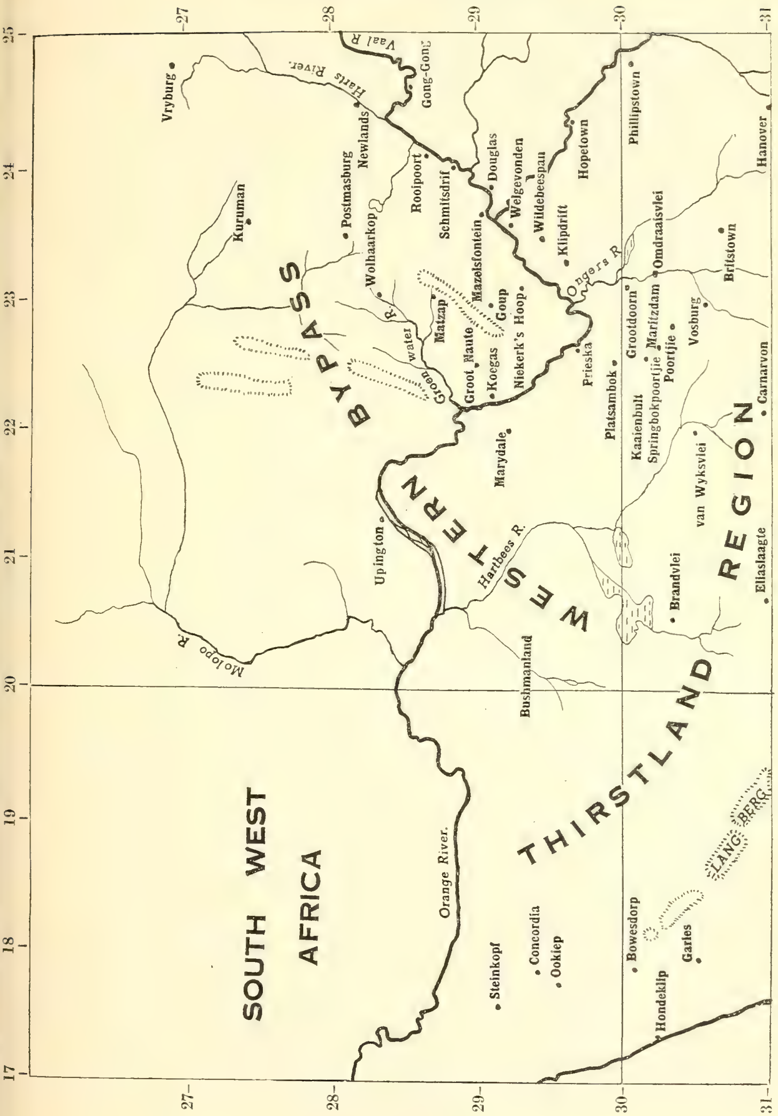
NATAL
LOWLAND
REGION
VAAL
REGION
FREE
STATE
FOCUS
BASUTOLAND
MASSIVES
SOUTHEAST REGION
THIRSTLAND
DRAKENSBERG
WITTEBERG
STORMBERG
SUURBERG
SNEEUBERG
Tugela R.
Buffalo R.
Wilge R.
Vet R.
Modder R.
Riet R.
Vaal R.
Harts R.
Caledon R.
Seekoe R.
Umzimvubu R.
Nkwaleni
Durban
Karridene
Pietermaritzburg
Richmond
Uvongo
Weenen
York
Balgowan
Ennersdale
Estcourt
Bergville
Underberg
Cedarville
Kokstad
Harding
Utrecht
Acton
Vrede
Standerton
Bavianskrans
Harrismith
Matatiele
Maclear
Xuka Drift
Buthabutha
Kroonstad
Winburg
Sepani
Herschel
Zastron
Rossouw
Brandfort
Bloemfontein
Smithfield
Aliwal North
Burghersdorp
Albert Dist.
Sheppard Island
Hoopstad
Kingswood
Bloemhof
Emmaus
Avalon
Bethulie
Philippolis
Colesburg
Naauwpoort
Schweizer Reneke
Christiania
Windsorton
Boshof
Kimberley
Alexandersfontein
Jakobsdal
Koffiefontein
Blaauwheuvel
Luckhoff
Fauresmith
Ramah
Belmont
Graspan
Koopmansfontein
Fourteen Streams
Newlands
Riverton
Barkly West
Pniel
Plooysburg
De Kiel Oost
Hopetown

MAP 2.


SOUTH WEST AFRICA
BYPASS
WESTERN
THIRSTLAND
REGION
Orange River.
Vaal R
Harts River.
Molopo R.
Hartbees R.
Ongers R.
Groen water R.
LANG BERG
Vryburg
Kuruman
Postmasburg
Newlands
Gong-Gong
Rooipoort
Schmitsdrif
Douglas
Welgevonden
Wildebeespan
Hopetown
Phillipstown
Wolhaarkop
Mazelsfontein
Klipdrift
Omdraaisvlei
Britstown
Hanover
Matzap
Goup
Niekerk's Hoop
Groot Naute
Koegas
Prieska
Grootdoorn
Maritzdam
Poortjie
Vosburg
Platsambok
Kaaienbult
Springbokpoortjie
Carnarvon
Marydale
van Wyksvlei
Upington
Brandvlei
Ellaslaagte
Bushmanland
Steinkopf
Concordia
Ookiep
Bowesdorp
Garies
Hondeklip
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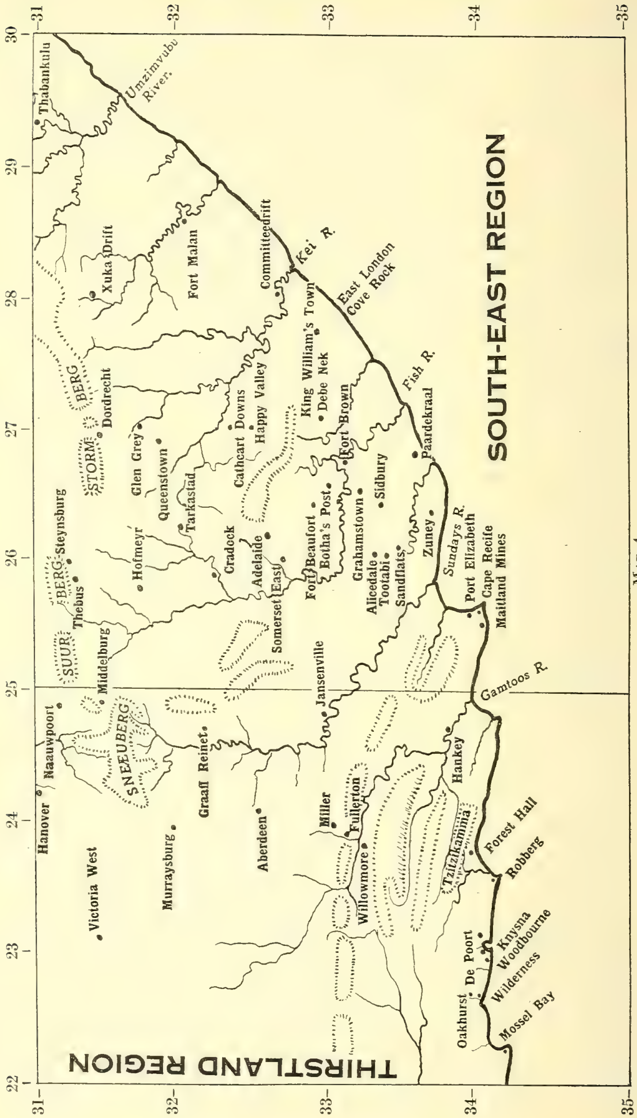
Map 3.


SOUTH-EAST REGION
THIRSTLAND REGION
Umzimvubu River.
Thabankulu
Xuka Drift
Fort Malan
Committeedrift
Kei R.
East London
Cove Rock
King William's Town
Debe Nek
Fort Brown
Fish R.
Paardekraal
STORM
BERG
Dordrecht
Glen Grey
Queenstown
Cathcart
Downs
Happy Valley
Tarkastad
Sidbury
Grahamstown
Beaufort
Botha's Post
Fort
Steynsburg
BERG
SUUR
Thebus
Middelburg
Hofmeyr
Cradock
Adelaide
Somerset East
Alicedale
Tootabi
Sandflats
Zuney
Sundays R.
Port Elizabeth
Cape Recife
Maitland Mines
Gamtoos R.
Naauwpoort
SNEEUBERG
Graaff Reinet
Jansenville
Hankey
Hanover
Aberdeen
Miller
Fullerton
Willowmore
Tzitzikamma
Forest Hall
Robberg
Victoria West
Murraysburg
Knysna
Woodbourne
De Poort
Wilderness
Oakhurst
Mossel Bay
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MAP 4.


17
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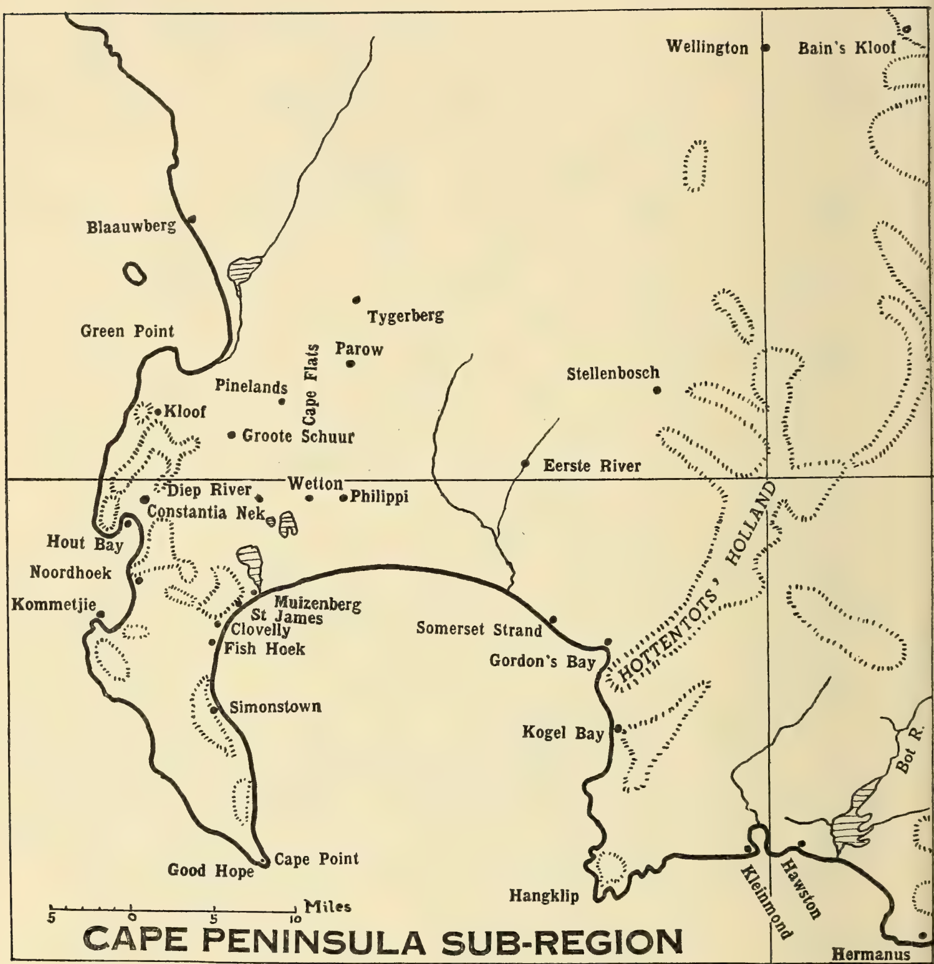
-30
-31
-32
-33
-34
Hondeklip
LANG
BERG
Brandvlei
Poortjie
Eliaslaagte
Carnarvon
Calvinia
Olifants R.
Klaver
Clanwilliam
BOKKEVELD MTS.
ROGGEVELD MTS.
Sutherland
Nelspoort
Beaufort West
Berg R.
KAROO
Laingsburg
Prince Albert
Swartberg
Vooruitsig
Oudtshoorn
Saldanha
Tulbagh
Cores
Moorreesburg
Ysterfontein
Malmesbury
Wellington
Goudini
Sandfontein
Anysberg
Armoed
Hazenjacht
Worcester
LANGEBERG
OUTENIQUA MTS.
Robertson
Montagu
Bellair
Ladismith
Barrydale
Riversdale
Oakhurst
George
Villiersdorp
Swellendam
Heidelberg
Albertinia
Caledon
Hermanus
CAPE REGION
Good Hope
Hangklip
Kleinmond
Hawston
Bot R.
Breede R.
Cape Infanta
Still Bay
Bloembos
Gouritz R.
Mossel Bay
Wilderness
Belvedere
Knysna

Map 5.


Wellington
Bain's Kloof
Blaauwberg
Tygerberg
Green Point
Parow
Cape Flats
Stellenbosch
Pinelands
Kloof
Groote Schuur
Eerste River
Diep River
Wetton
Philippi
Constantia Nek
Hout Bay
Noordhoek
Kommetjie
Muizenberg
St James
Clovelly
Fish Hoek
Somerset Strand
Gordon's Bay
HOTTENTOTS' HOLLAND
Simonstown
Kogel Bay
Bot R.
Cape Point
Good Hope
Hangklip
Kleinmond
Hawston
Hermanus
5 0 5 10 Miles
CAPE PENINSULA SUB-REGION

MAP 6.

PART III.—MIGRATIONS.

In Part I of this work, and also on page 108, we referred to the possibility of making certain deductions regarding migrational routes. This third part will consist of an analysis of a selection of the material listed above, with a view to reconstructing the routes by which Later Stone Age man spread inside the Union. It is to be hoped that further and more detailed work may be done on the remaining material, as more exact and fuller knowledge is at our disposal.

It has been shown conclusively that types exist, and areas and regions have been selected in such a way as to isolate habitually associated types in relation to geography. This arrangement is not of such great significance as I had at first thought. My prejudices in 1926 when I laid down my task, and in 1939 when I took it up once again, led me to presume that I should be analysing tribal or hunting areas, each of which would be neatly typified by certain forms of bored stones, and be limited to recognisable boundaries. That may be the sort of thing these areas do represent, but it is obvious that, if so, they were neither static nor stable, but that they overlapped and cut into one another from time to time, probably in relation to the waxing and waning of tribal strength.

It might be argued by critics that the types result from the grouping into areas, and that they do not exist except as an over-careful geographical patterning on the part of the author. There are several arguments that should make it abundantly clear that this is not so, or that such a probability is so remote that it can be ignored with safety.

1. The arrangement acts in all parts of the Union for the Prehistoric Series only. In contrast, no manner of adjustment will permit us to fit the culturally different Bantu Series into any type-area arrangement. If unconscious prejudice had permitted the evidence for the more widespread series to be so consistently twisted, it should have been easier to do the same for a smaller and more confined series.

2. The grouping developed is directly related in every instance to geography; not as the scientific cartographer sees it, but as an immigrant pedestrian people would find it on approaching consistently from the north, progressing by timid trial and fatal error. The present arrangement into areas in many instances cuts across my own

prejudices that expected a neat arrangement of static areas, based upon my "ecological" concepts of where those areas should be.

3. It therefore becomes obvious that with a migrating people, the route and the point of entry are more important than the static area. In this instance, except in the heavily colonised focal areas, routes are the more important. The complex of migrational routes revealed was logical and consistent. Each path was directly related to, and governed by, geographical factors. Each in turn emanated from a previous stage, often marked by a period of sojourn in a focal area. It is the logic of these routes that most decidedly proves the existence of types *per se*.

The Selection of Migrational Types.

The problem is not simply to follow migrations, but is complicated by the multiplicity of types. Two, three, or even more cultural migrations into a single area have occurred in an unknown order. At Koffiefontein A and B there is every suggestion that over a long period there have been at least two cultural waves, and that types have persisted there long enough to diverge from series A to series B or in the opposite sense.

It was shown earlier that consecutive, serial, or divergent copying might either yield divergence or permit errors to cancel out partially so as to maintain the original grouping. There is thus some risk involved in selecting closely related types for the purposes of following migration. It has been shown that within a single area types may show a scatter of 2·5 cm. (about an inch). The scatter is often less then 1·3 cm. In working from one area to another, only examples within that smaller range will be considered. The main deviation from this rule lies in those exceptional shapes in which the possibility of assimilation into an adjacent graphical type (that is, the chances of sliding off one group and on to another) can be eliminated. For these reasons several members of local groups, as given in Part II above, will be ignored. Those conforming most closely to the average will be considered. The general average given with each migration will usually diverge less than 10 mm. from any specimen within the group, unless a change of average is given.

Environmental Factors.

In general we can group those environmental factors controlling man's sojourn or his migrations under two general heads: *barriers*

or limiting factors, either complete or partial in their actions, and *attractors,* factors that draw migration to habitable areas or to focal points. We are dealing in this Prehistoric Series with hunting and collecting peoples, and in the later Bantu Series with cattle-keepers and agriculturalists, so that the applicability of these two groups of factors may not be identical, but variation should not be great as an area attractive to a hunter is generally suited to a herder.

Barriers.—It is obvious that the major barrier to movement in South Africa has always been the Basutoland massif. It accounts to-day for the relatively sharp demarcation between Nguni and Sotho tribes, and appears to have a general relationship to the distribution of cave paintings and petroglyphs in the Later Stone Age. It may have proved a factor dividing the Smithfield and Wilton people from one another, though the present paper yields little evidence on this point. This very effective barrier is further extended northward and south-westward in the series of mountains forming the main watershed of South Africa. This is markedly seen in the elongated forms of the bored stone, where upcountry and coastal forms appear to present two partially separate distributions. The unexpected importance of the Sneeuwberg as a barrier will be touched upon later.

In certain areas rivers appear to form barriers; thus the Orange River at first appears to be an important divide in the distribution of circular types, and seems to have held back movement southward for a long time. A river may be a barrier for various reasons, by reason of its width, depth, volume or strength of flow. But in the case of the Orange it would seem that the area of further expansion to the south was too unattractive to draw these early hunters across the Thirstland to the unknown coast. It needed what Horace calls the *aes triplex,* the thrice brazen courage of the navigator, to press forward across these dry expanses. A final but very important element is agreement. If two ethnic groups agree to confine themselves to their respective sides of a river, then, however small the stream may be, it will provide a political boundary as effective as man is willing to make it. The tendency among the early Bushmen (and indeed among all known hunting peoples) to confine their activities to delimited hunting and collecting grounds, and to certain water-rights, is too well known to be ignored.

Rivers have been shown on the maps used, and certain mountains. The selection of the latter is not related to height above sea-level, but to "effective height," which includes the steepness, ruggedness,

height above the immediate surroundings, etc., of a range. Ethnologically the importance of mountain ranges consists in the drainage, gaps and neks through which migration may take place, and their effective height; *i.e.* their ability to prevent, inhibit, divert, or permit man's migrations in a particular direction.

Attractors.—In general, drainage areas provide the main areas of attraction in South Africa. In a country where water is often scarce, animals and men arrange their lives in relation to the distribution of water. Abundant water will attract, while arid areas will repel or may provide migrational routes, skirting their edges, or along the valleys of intermittent rivers, such as the Seekoei River, the Groenwater, the Hartbees and the Ongers Rivers. Rivers are indeed more often foci of attraction than barriers to man's movements. To a hunter a river that can be quickly and easily crossed by a hunted animal can hardly be permitted to act as a barrier. Where a gorge or swift stream intervenes the position may be different.

The Free State has provided so great an attraction to Later Stone Age man that I have employed the terms "focus" or "focal area" to describe it. Here we have a dozen rivers converging on the Vaal and Orange Rivers, few of them large enough to provide a barrier for most of their length, and all attractive for the greater part of the year. The watersheds are never high, consisting mainly of wide downlands, where cross currents from one river to another have been possible. We have the Harts and the Vaal, the Vet, Modder, Riet, Caledon and the Orange. In addition there are northward-flowing streams of importance, the Valsch, the Wilge, and so on. Of the material from the area fed by these last I have been unable to obtain much information. Most of it is housed in the National Museum, Bloemfontein, where it is presumably being ably dealt with by Dr E. C. N. van Hoepen, but has not been made available to me.

The possibility that mountains may, under certain conditions, prove attractive to hunters and collectors must not be overlooked. In most areas the deep-cut mountain-sides and the high precipitation of rain or dew provide the main concentrations of wild fruits, roots, and edible plants, and overhanging kranses provide shelter from prevailing winds. The Western Langeberg area gives us an example. Here the mountain-side on the north of the Breede River valley shows distinctive types, differing from those in the open valley, west and south of the river. Basutoland will eventually show a similar localisation of types.

An analogous state of affairs seems to exist in the kloofs cutting the

peneplain towards the southern coast, where deep and often wooded valleys similarly yield protection, water, vegetable foods, and a certain degree of isolation. These valleys may link back to the mountain ranges immediately behind, or may run back through the first range to further valleys running parallel with the coast. The Gouritz River provides an example of a river cutting across parallel valleys, and the Sundays River, Bushmans River, etc., are all very similar.

Remarks on these two opposing functions of geographical forces—attraction and repulsion—have been touched upon in considering individual areas above, and will be dealt with further in discussing specific migrational routes.

Migrational Routes.

These may be merely points of access between areas of attraction, fords over rivers or passes through mountains They may, however, in a dry and barren land, be river-beds only usable in the rainy season or in years in which there happens to be an episodic rainy season. The Seekoei River, and probably the Kuruman and Molopo Rivers (of which we know little in the prehistoric period) were of such a type. In many cases it is obvious that the headwaters of one river will lead to within a mile of the headwaters of another, across the low divide of a watershed. In this way the Limpopo served the upwaters of the Molopo and Kuruman Rivers, which in turn led across the Orange River, up the Hartbees River to its headwaters. This route was chosen by the MaNtatisi movement, and previously provided the Western Bypass. An analogous action seems to have taken place in prehistoric times, leading migrations down the Nylstroom from the Limpopo River basin to the Upper Vaal. The Klip River carried the early colonisers of Natal from the Vaal to the upwaters of the Buffalo, at Laing's Nek. Cases of the same sort will be dealt with as we proceed.

The Directions of Movement.

Except where the general direction of a movement is obvious (*e.g.* from the Transvaal to Natal, and from the Transvaal to the Free State, and those cases in which migration obviously started from the Free State and spread radially from certain points on the Orange), it is difficult to discern the direction in which migration occurred. There is a fundamental presumption in the following pages, that all move-

ment tended to proceed from the north southward. It is presumed that the Transvaal peopled the Free State, which in turn provided the main source for the peoples of the Cape Province, and the possibility of any return movement is ignored. Once the southern coast is reached no real presumption can be made, though there are certain indications that can be made to supply a clue. When discussing that stretch of coast I pointed out that lateral movements occurred between the serried ranks of mountains, in relation either to the streams running east and west or to the coast-line itself. It is easily possible in that area for a migration of some magnitude to pass across the southernmost Cape from east to west, or from west to east, without affecting a neighbouring movement between adjacent ranges, or along the coastal belt. This would be even easier along the natural forest belts near the coast, where a sharply contrasting environment would possibly deter the movements of an inland people. This area therefore is to be regarded as a belt along which parallel or even contra-parallel migrations might take place without mutual interference.

I regard the Cape of Good Hope as generally late—the end of a series of movements through the Hinterland area along the south coast. But what of the south coast itself? Was this fed by way of the Sundays River; was it fed through the Breede River valley; was it perhaps fed through Oudtshoorn to George and Mossel Bay? The answer involves all three routes, and we can take it that the general tendency of coastal spread was from east to west, though return movements are to be expected. But the almost cross-shaped catchment areas of the river beds also permit of transverse movements, either from the coast inland or in the opposite sense. A local and intensive study of other analysable factors, such as pottery, styles of painting, implements, etc., may eventually yield a clue to the question.

Migration will be given from east to west as the important sources of movement seem to lie to the east, but there are subsidiary routes constantly cutting in on this east to west migration. If the main southward movement enters the coastal strip to the east, or to the west, the direction of flow is obvious. If it enters towards the centre of the coastal distribution, then we may presume a lateral spread in two directions. Even in the spread of a single type of bored stone all three possibilities have to be taken into account, as a glance at the charts provided later will show (pp. 143–145).

Where definite barriers have limited spread, the question is somewhat simplified. Only two such barriers, apart from the sea, exist. The first is the Basutoland mountain massif. This has provided us

with a certain key to two areas, Natal and the lower Thornveld, and a strong basis for presumption regarding the Northern Transkei. It so happens that the two migrational routes separated by the Basutoland divide lead from the Transvaal to the heart of the Free State Smithfield, and to the heart of the Natal Smithfield, obviously parallel developments from a single northern source. We thus have a valuable key to the origins of this complex cultural development.

The second important divide, probably the product of chance as much as anything, is the Sneeuwberg range, which divided the migrations over the Western crossing of the Orange from those over the Central crossing of the Orange. The presence of this divide must in future be regarded as of the utmost ethnological importance in the Later Stone Age.

In the extreme south it has been suggested that movements to and from the coast by way of rivers cutting directly across the line of the valleys running parallel to the coast played an interesting part. These movements may have been purely migrational, but there is a possibility that they may have been annual movements from the coast inland during certain seasons of the year. We must therefore expect to find seashell ornaments, etc., carried back from the coast along these rivers to the inland areas. The valleys running parallel to the coast account for the distribution of a type at Ladismith (Cape) and in the West Langeberg area, and of a prolate type at Oakhurst and at Riversdale, with no known intervening examples.

Types of Route.

The question of routes dissolves itself into a problem exactly analogous with that of the modern communications of a country. There are three main types of route: highways along which migration normally flows; bypasses that skirt the areas fed by the highways and so provide a simpler picture; and lateral or feeder routes, that transgress the more important highways and bypasses constituting the normal orientation of a country's flow, and intrude odd elements from laterally situated sources.

This analogy of the modern highway may be carried further. A highway starts at a primary distributive centre, from there goods are carried for distribution in the immediate neighbourhood and yield a typical strip development, then continue along highways and bypasses to secondary centres of distribution. This analogy fits the prehistoric and primitive highway.

This secondary distributive centre is an area of focus where migra-

tion consolidates, and where the new population may increase to the limits of local saturation. Then there follows a series of divergent distributive routes, radial, and often cutting directly across other highways or joining with them. The cross-road is difficult to disentangle. It depends for its understanding upon the careful analysis of surrounding areas and the use of the subtractive approach. By this I mean that once a group is understood in terms of an adjacent area, it may be subtracted, and the residue dealt with by the same approach. This method is employed for the crossing of the Namaqualand highway and the Western Bypass at Prieska. I would hardly have dared to untie this Gordian knot had it not been for the considerable help supplied to me by Mr C. Wilmot of Prieska. The tangle now resolves itself into a neat pattern of intersecting strands of migration.

In relation to environment various types of route can be distinguished. Those passing from the headwater of one stream to the source of another flowing in the opposite direction. Those following river-beds through dry regions, or along such great streams as the Vaal and Orange. Routes skirting mountains at a fairly high level—the southern extension of the Natal Highlands area belongs to this class. Routes keeping to a low level, and generally related to a wide coastal belt, such as the Natal Lowlands. Routes confined to narrow valleys, such as the Groot River, the Breede and the Berg, often cut off from outside influence.

Order of Treatment.

While I have spoken of the Transvaal as the prototype region, a primary distributive centre, this is only true for South Africa. The bored stone is too well known in the body of Africa for us to ignore the fact that it is immigrant. We will discuss possible points of entry first. From the Transvaal there are two great routes, the Western Bypass to the Bokkeveld, and the road to the *cul-de-sac* of the Natal Highlands. These will be discussed next, with whatever lateral byways may have fed them. There is also a central highway down the Vaal River, from which lateral or feeder roads spread over the Free State along its southern river system. In this Focal Region movement seems to have been held back during a considerable period of populational stability and expansion, if the quantities of bored stones, implements, rock engravings and paintings provide any criteria. This may therefore be called the Deuterotype Region, and the new migrations that passed southward by three or four main crossings of the Vaal and Orange Rivers may be regarded as having their

immediate origins here. These crossings of the Thirstland towards the south, and the mountains towards the east, will be dealt with in turn as new stages in migration.

South of the Orange the Sneeuwberg seems to provide an important divide. From here migrations will be followed to the coast and along it wherever possible. Finally a few movements that do not link very securely with inland types will be discussed. Treatment will not be exhaustive, but suggestive examples of major migrations will be given.

Entry into the Union.

(A) The junction of the Crocodile and Marico Rivers at about 27° E. by 24° S., just north of the Dwarsberg, at once suggests itself as an important point of entry into the Union, for a variety of reasons:

1. It is nearly related to the Victoria Falls, above which most major movements have crossed the Zambesi into southern Africa.

2. It is an area in which four groups of bored stone seem to have diverged from two original types (probably 11·9 × 8·3 cm. and 10·5 by 8·0 cm.), and spread southwards over the entire Vet-Marico area, to cut deeply into the whole Transvaal.

3. Lateral movement into the Transvaal in relation to the east-west valleys and mountain folds of the central Transvaal would be natural and attractive. In recent years this was the natural line of movement used by various Sotho tribes.

One cogent argument can be adduced against our selection of this point as the main doorway to the Union. It is probably important, and certainly obscure. Of perhaps a dozen specimens from this area four have a conical bore. If this is a result of the use of metal, as I suspect, then this might be regarded as an argument in favour of fairly recent immigration by this route, by a people who were themselves users of metals, or were in contact with Hottentot or Bantu metal users. It is just possible that these stones were bored from one face only with a stone borer, and that this difficult technique was later dropped in favour of the easier biconical bore. These examples cut across other groupings, and can be differentiated into two groups, 12·0 × 8·2 cm. (one example only) and 11·0 × 7·2 cm., close enough to each other to be regarded as a single group. If these four examples are removed from the Vet-Marico series as Bantu, the averages are not very greatly affected.

(B) Even if we regard (A) as a possible point of entry it would not account for all the Transvaal types. One Central Transvaal type (14·1 × 10·5 cm.) that certainly developed into the Southern Transvaal

type (12·9 × 10·2 cm.) may have entered by way of the Mogalakwena River or along the Sand River (29° S. × 30° E.) to the Pietersburg Highlands.

The 8·0 × 5·5 cm. group, present in the Central Transvaal, and in a derived form (8·8 × 5·2 cm.) in the Southern Transvaal, is absent from the Eastern Transvaal and the Vet-Marico River area. I would therefore suggest a similar origin for this. The same may be said of the small type (about 6·0 × 4·0 cm.) that occurs at Button's Kop, and has spread throughout the Southern Transvaal, presumably as a knobkerrie head.

(C) The 10·0 × 5·5 cm. and the 10·7 × 4·4 cm. groups, common in the Central Transvaal, miss the Southern Transvaal area, but reappear in the little-known Eastern Transvaal. Possibly these two types are related, but they do not seem to have been associated with the same migrations that brought the three types mentioned above under (B). They may be associable with (A), or they may have entered across the Limpopo, east of the Magato mountains, perhaps by way of the Pafuri River (31° E. long.) accessible to both the Central and the Eastern Transvaal. This route is highly speculative.

These seven prototypes I regard as sufficient to account for most of the Transvaal averages, and for those of the Vet-Marico River area. It is perfectly possible that they may be held to account for all the South African types, except those of the Natal Lowlands and a few (very few) of the types on the south coast. I refuse to make any attempt to enter this somewhat speculative field.

Several important points are worthy of consideration. The Southern and the Eastern Transvaal are mutually exclusive, while the types in the Vet-Marico area agree with those of the Eastern Transvaal, and therefore exclude Southern Transvaal types. Expressed differently, the Central Transvaal includes all the prototypes; the Southern Transvaal includes three only; the Vet-Marico area shows three, and the Eastern Transvaal four of the remainder. This suggests the crossing of two routes in the Central Transvaal. The one from VMR. to ET., the other through CT. to ST.

Prototype.	VMR.	CT.	ST.	ET.	Route.
1. 13·5 × 10·5		14·1 × 10·5	12·9 × 10·2		B
2. 12·0 × 8·2	11·6 × 8·4	11·7 × 7·8		12·3 × 8·6	A
3. 10·5 × 8·1	10·7 × 7·6	10·2 × 8·2		10·5 × 8·0	A
4. 10·0 × 5·5		10·0 × 5·4		10·2 × 5·9	C
5. 10·7 × 4·4	(9·4 × 3·7)	10·8 × 4·2		10·7 × 4·6	A or C
6. 8·0 × 5·5		7·7 × 5·6	8·8 × 5·2		B
7. 6·0 × 4·0		5·7 × 3·6	6·5 × 4·2		B

In the Central Transvaal two specimens averaging 12·2 × 9·2 cm. are obviously related to divergents from prototype 1 as it occurs in the Southern Transvaal; this suggests a return movement. Two other specimens from CT., averaging 11·5 × 5·4 cm., are seemingly divergents from prototype 4. One of the VMR. examples approximates to this type (Bloemhof, 11·7 × 5·8 cm.) and is probably related to a nearby specimen from CT. at Potchefstroom. The VMR. stone listed above as a development from prototype 5 is a single specimen, and the fairly wide divergence from the average suggests that it may be a secondary development of atypical dimensions.

The Natal Route.*

In general the migrations from the Transvaal southwards along the Natal route, the Western Bypass, and down the Vaal are all relatively easy to follow. Almost all the prototypes can be followed along these three great routes. The opposite is not true, for we can hardly speculate on the origins of the Natal Lowlands types, and the affinity these show to examples from the Schoonspruit-Vaal area cannot be regarded as more than superficial, as the latter disc types are products of the local schistose rocks.

Some interesting and important points emerge in our study of the Natal Highlands, each of which needs careful consideration in any future work in that area.

1. The Natal Highlands types show no relationship to forms south of the Tsitsa-Tina and Umzimvubu basin, from where only two examples are known. Spread southward seems therefore to have ceased at Mount Currie and Mount Ayliff.

2. The Natal Highlands seldom transgresses the Natal Lowlands area, and there appears to be a marked divide at about the 2000-foot level (650 m.). The Lowlands area was certainly fed from a different source, probably from the Portuguese East African, St. Lucia, and Zululand Lowlands.

3. The Highlands are situated along the eastern slopes of the Drakensberg, and are cut off from the Free State by the Basutoland massifs.

4. The area is further cut off from the Free State focal area by an important field of distribution, the southern portion of the Vet-Marico area, that contains no types similar to those from the Natal Highlands.

* Maps of routes are added at the end of this part, following page 142.

5. It is highly probable that this Vet-Marico area was not a highway, but an area of spread or colonisation. It is obviously a marginal area with few types, lying between more attractive migrational routes, the Vaal running west and south, and the Klip River running to the Majuba Hill, where it almost meets the Buffalo-Tugela complex some 8 or 9 miles away.

6. Excluding the Durban anomaly, five of the remaining six Natal Highlands averages are represented in the Transvaal prototype areas, and show affinities with prototypes 1, 2, 4, and 7. Two derivatives of this last are represented, one related to the Southern and one to the Central Transvaal. Prototypes 1, 4, and 7 are absent in the VMR., while the Natal Highlands derivative of type 2 is allied to the Eastern Transvaal form, not to the VMR. average.

7. Certain Natal Highlands types are associable with Smithfield N material, a variation showing marked differences from the Smithfield series of the Free State, and one which I have shown has characteristic affinities with Southern Rhodesia that are absent in the Free State.*

8. The closest affinity (apart from the prototype area) with the NH. area is at Bloemfontein and Sepani, where one type only shows analogies. The BS. area is cut off from NH. by the Basutoland massifs and by the VMR. area.

We thus have at our disposal the material for tracing the migrations of the Later Stone Age people from the Transvaal to the Natal Highlands. This suggests a possibility of an early pre-Smithfield culture in the Transvaal, parent to both the Free State and the Natal variants.

1.† (13·5 × 10·5 cm., Prototype 1.)

Potgietersrust.
Brits.

Brits-Rustenburg Road.	Pretoria.
Rustenburg.	Bronkhorstspruit.
	Standerton.
	Estcourt.
	Maclear.

Prototype 1 may have originated either in the Western or the Northern Transvaal, but its journey from Pretoria is clearly through Newcastle or Botha's Pass, or another nearby gap in the mountains about Majuba (29° 50′ E., 27° 30′ S.).

* Goodwin, Proc. Rhod. Sci. Ass., xxxiv, 1934.

† Examples of migrational routes are numbered consecutively for ease of reference. The same initial number is used on the maps for each route.

2. (11·9 × 8·3 cm., Prototype 2.)

Lichtenburg.
Ventersdorp.
Eerstefabrieken.

Kransfontein. Ermelo.
Acton.

Utrecht.
Stanger.
Durban.

Prototype 2 had a different story; it seems that one movement went along the valleys of the Transvaal from west to east as far as Ermelo, then through Pietretief to Utrecht. An alternative route from Eerstefabrieken passes Harrismith and the van Reenen's Pass.

The remaining three examples given below all suggest the Majuba route. It is to be observed that Prototype 4 is the most clearly associable with the Smithfield N material at Balgowan.

3. (10·0 × 5·5 cm., Prototype 4.)

Molsgat.

Kensington. Wonderboom. Belfast.
Bethal. Jakslust.
Balgowan. Barberton.
Durban.
Matatiele.
Kokstad.

4. (6·0 × 4·0 cm., Prototype 7.)

Button's Kop.

Magaliesburg. Germiston.
Johannesburg. Bergville.
Pietermaritzburg.
Underberg.
Cedarville.

Analysis of a further, final series is unconvincing. The type (7·5 × 2·5 cm.) is evident only in the Suikerboschrand valley at Vereeniging and at Barnard's Kop, Heidelberg (Transvaal), and appears to link with the Harding specimen from Southern Natal, a gap of 300 miles.

Natal Lowlands.

Of the origins of the Natal Lowlands types with indices below 40 we know nothing. Far more will have to be known of the Northern Transkei, especially the coastal belt, before we can presume a migration from the south. It is more likely that this Natal series links through

Zululand lowlands with Portuguese Moçambique, areas as little known as those to the immediate south.

Western Bypass.

Five migrations, starting at various points and continuing for varying distances along this Bypass, can be followed. The Bypass consists of three areas skirting the eastern edge of the Kalahari and the western watershed of the Harts and Vaal Rivers. It seems to run from the sources of the Molopo River southwards to within 150 miles of Cape Town, and there ceases. The three areas are the Molopo-Groenwater, the Upington-Hartbees, and the Bokkeveld areas.

5. (13·7 × 11·2 cm., related to Prototype 1.) Obviously originated in the Central Transvaal, from whence the Vaal-Harts area is reached, and examples occur at Bloemhof and Newlands. From there the route follows the Vaal to Rietpan, Barkly West, and to Fauresmith and the Modder River. A parallel road, continuing farther to the south, and presumably starting at Bloemhof, runs as follows:—

Vryburg A.
Postmasburg.
Niekerk's Hope.
Uitdraai.
Springbokpoortje.

Groetvloer.
Vanwyksvlei.
Blaaukrans (Carnarvon).

Omdraaivlei.
Vosburg.
Victoria West.

This type does not reach the Bokkeveld area.

6. (12·3 × 7·2 cm., Prototype 2.) Perhaps an offshoot from the Central Transvaal type iii, where examples occur at Ventersdorp and at Lichtenburg, from where the route runs:

Vryburg A.
Kuruman.
Bultfontein.

Upington.
Kenhardt.

Hondeklip Bay.

Calvinia.
Klaver.

Redlands (Prieska).
Keikamspoort (Prieska).
Klipdrift.
Poortje.

7. (10·9 × 7·2 cm., related to VMR. iv.) Sites at Klerksdorp, Kroonstad, and Brandfort provide a fan-shaped distribution, converging on Bloemhof from where the distribution runs:

Postmasburg.
Groot Nauta.

Upington.

Middelwater.
Calvinia.

Kimberley and Douglas show analogies, and it is possible that there was a lateral movement along the Orange. This route obviously resembles example 5.

8. (8·0 × 6·0 cm., Prototype 6.) A lateral drift that does not seem to have followed the Bypass in either direction, it may represent part of a roadway to the Southern Kalahari.

Koffiefontein.
Kimberley.
Gonggong (Barkly West).
Winter's Rush.
Douglas.
Kuruman.
Wolhaarkop.
Koegas.

9. (6·8 × 4·8 cm., Prototype 7.) This lateral movement follows much the same route, but turns southward across the Orange to the Trekveld and Winterveld areas, presumably from Barkly West.

Windsorton.
Kimberley. Botterhoek.
Kanteen Kop.
Kuruman. Barkly West.
Goup.
Wildebeespan.
Vosburg.
Vanwyksvlei. Britstown.
Victoria West.

This may provide the origin of the Trekveld iii type that shows a local distribution at Eliaslaagte, etc.

Namaqualand Route.

Although this route appears to have some relationship with the Vaal-Orange confluence, I shall deal with it here, partly to clear up the western Thirstlands, and also because I suspect the possibility of a direct route along the Molopo River to Namaqualand. The evidence is slight, and consists at present of a marked gap in example 12 below. The Orange River route would have been far easier to follow, once the confluence of this river and the Vaal had been reached. A long stretch along the Orange is quite unknown to us at present.

10. (12·0 × 9·5 cm.) This starts from Newlands, and, for all we

know, may also have passed directly along the Molopo from there. The southward route is quite clear.

Newlands.
Riverton.
Barkly West.
Pniel.
Schmidt's Drift.
Prieska.
Witfontein.
Steinkopf.
Concordia.
Kamieskroon.
"Namaqualand."

11. (10·5 × 8·5 cm.) Almost certainly related in ultimate origins to 10.

Windsorton.
Witboom, Hay.
Katlani.
Grootdoorn.
Prieska.
Marydale.
Steinkopf.
Garies.

12. (9·0 × 7·5 cm.) A shorter form of the above route. Four examples occur at Prieska. There are three possibilities here. Either this is a movement directly across to Namaqualand from Fourteen Streams, with a return movement along the Orange; or it is a movement down the Vaal similar to 10 and 11; or it links with the Free State, a complex that can be seen under example 23 below.

Hoopstad.
Sheppard Island.
Fourteen Streams.
(gap)
St. Clair.
Prieska.
Kaaienbult.
Concordia.
Steinkopf.

Finally, the small Steinkopf specimen (4·2 × 3·3 cm.) has analogies at Smithfield, Bethelpella, Koffiefontein B, Belmont, and in the Winterveld. The similarity is suggestive, but carries no weight at present.

Southern Highways.

Enough has been said elsewhere to show that most of the prototypes of the Transvaal have passed southward along the Vaal River by way of the Vaal Harts, the Middle and the Lower Vaal areas,

or across a wide front on the Free State section of the Vet-Marico area. The next series of movements to be discussed were from the Vaal, generally eastward along the complex pattern of rivers in the Free State, and transversely across the direction of flow, over low hills or denuded plains set with isolated doleritic kopjes. It would be useless to trace these movements in detail. The references given in the column of comparisons, after the type averages in Part II, should speak amply for the cross-currents in the confined focal areas.

This Free State Region is important. It supplied a focal area for consolidation, internal expansion and finally for movements to less thickly populated areas. The Orange River and the Basutoland mountains with their southern extensions provided a barrier to the south-east, while the increasing aridity encountered by any movement towards the west from the Vaal basin across the Kaap Plateau, and the general dryness of the land to the south of the Orange, precluded easy migration in these directions. We must therefore presume that there was little incentive for the Free State people to break through these barriers until pressure forced such a drastic step. Pressure may have been the product of over-population, but is more likely to have been due to the pressure of new peoples from the north, be they Hottentot, Wilton, or Bantu. The very considerable lag due to consolidation in the Free State may account for the obvious lateness of the Later Stone Age along the coastal belt, especially towards the Cape.

The breaking through of the Orange River ethnic barrier (or better, the initiation of real migrations across the Thirstland, in contrast to confined hunting movements) provided an effective filter. Only certain types transgressed towards the south and south-east, and the routes they took seem to have been limited.

We can recognise three points of origin for the various movements that left the Free State and Vaal River Regions. This small number of breaks-through on a front seven hundred miles long is surprising, until it is realised that the Orange did not in itself provide the major barrier, but the repellent country farther south and east. The Orange may have been crossed at any point, but migrations across the Thirstland tended to follow the same routes in their new migrational pattern.

The first point seems to have been near the present main railway line from the Cape to Kimberley, between Belmont and Hopetown. Next were points between Bethulie Bridge and Aliwal North, forming the Central Crossing. Farther east there is a more speculative break-

through from the eastern sources of the Orange, high in the Basutoland Massifs, through Qacha's Nek and neighbouring gaps to the Matatiele district, the Eastern Exit. These three crossings will be dealt with in order from West to East.

The Western Crossing.

As we have already seen, the main routes to Namaqualand and the feeders to the Western Bypass seem to have crossed the Vaal at Douglas. This crossing may be said to be the gateway to south-western Africa. In contrast the southward routes appear to have crossed at a point coinciding with the origins of the Winterveld area, between Belmont and Hope Town. If Douglas fed Namaqualand, the Orange River basin and the Trekveld, then the general area of Belmont was the gateway to the Winterveld and certain points on the south coast of the continent.

We may follow the more important Winterveld types. They appear to yield somewhat sketchy routes, but they are sufficiently consistent to prove that this route across the dry semi-desert country was used by man. It has good rains in certain years, and was once the haunt of great herds of springbok and other mobile types of game before man interfered with essential migrations by erecting fences. Oddly enough, the Vosburg specimens were found in association with a large unidentified pachyderm (possibly rhinoceros), suggesting that even these animals migrated across the dry Winterveld at times. Three environmental factors determined this route, the Ongers River, the Seekoei River, and the Sneeuwberg mountains.

13. (14·6 × 13·0 cm.) This distribution does not suggest a true migration, but rather a local spread. The type occurs at Rietpan, Botterhoek, Belmont, then crosses the Orange to Philipstown, Omdraaisvlei, and Britstown. The size suggests that it may quite possibly be Bantu, the product of the final scattering of the MaNtatisi refugees.

14. (14·7 × 10·0 cm.) This has a scattered distribution. Unlike example 13, it is present in the Free State proper at Koffiefontein B. The further distribution includes two sites near Prieska and one near Britstown, south of this it occurs at Victoria West, Three Sisters, Beaufort West, and Aberdeen.

15. (12·9 × 9·0 cm.) The graphical scatter is remarkably compact when worked out on a graph paper. It is represented by the first specimen listed at Koffiefontein A, then follows this route southward:

Koffiefontein A.

Welgevonden.
Poortje.

Britstown.
Graaff Reinet.
Jansenville.
Swartberg.

Mossel Bay.
Breede River.
Cape Middens.
Sandveld.

Knysna.

The southern portion of this distribution seems to run behind the mountains, parallel to the southern coast, and to avoid the coast for most of the route.

16. (10·0 × 7·5 cm.) This probably belongs to the same route as 15, but there are gaps.

Smithfield.
Koffiefontein B.
Britstown.
Hanover.

From here it occurs in the Swartberg area, and from there links with Knysna (KTZ. ix), SR. i, BMR. v, and WL. ii. The journey from the Swartberg to the West Langeberg may be associable with a mountain people. (Compare example 26.)

17. (3·7 × 2·5 cm.) Beadlike or ornamental forms that show a wide variation in size occur at Smithfield, Koffiefontein B, Belmont, Hope Town, Middelwater, Britstown, and Hanover. South of this the smaller examples disappear except for a single example from the Helderberg, and any deduction would be speculative. It seems likely that these too may be MaNtatisi in origin, and they have much the same dispersal as example 13, but compare the note below example 12 (above).

It will have been observed that the Koffiefontein B series on the northern side of the Orange plays an important part in the study of those groups that are sufficiently numerous to follow. This does not mean that Koffiefontein was the original home of these Winterveld people, but it does provide an important clue to the point at which the river was crossed by the migrations passing west of the Sneeuwberg range, and also it is highly suggestive of the type of culture that was carried along this route. We should expect a new point of dispersal in the Swartberg area, feeding the coast at Mossel Bay and Knysna, and feeding westward to the Western Langeberg along hidden valleys, then across to the Sandveld and Swartland areas by way of the Breede River.

The importance of Britstown in all these distributions is quite

certainly due to its association with the Ongers River and to its close proximity to the Seekoei River, north of the Sneeuwberg.

Central Crossing.

In much the same way that Koffiefontein provides a point of origin for migrations across the Orange to Britstown, so Smithfield provides a bridgehead for the Central Crossing that leads to the Upper Thornveld area. From here two alternative routes seem to have been presented, either directly down the Tsomo and Great Kei Rivers, or else down the Fish and Sundays Rivers. At times both may have been taken. Enough examples will be considered to prove the presence of these routes and to show the general line of their direction, consistently east of the Sneeuwberg mountains.

18. (13·0 × 11·0 cm.) This rather complex series probably links with example 5 above, either in its origins or in its middle phases, but intervening sites are absent.

Middle Vaal.
Modder River.
Fauresmith.
Smithfield.

Burghersdorp
?
(Murraysburg).

Rossouw.
Cathcart Downs.
Grahamstown (14·2 × 10·5 cm.).
Port Elizabeth.

This may or may not prove to be linked with a more local movement with some changes in size. The evidence is added here in case later evidence clarifies the position. The direction taken is speculative, and while I suggest that Murraysburg provides the link, it may possibly occur between Port Elizabeth and Knysna.

Murraysburg (12·1 × 11·0 cm.).

Beaufort West.
Ladismith.
Montagu.

Worcester.

Kogel Bay.
Gordon's Bay.

Grootrivier (13·0 × 12·0 cm.).
Knysna.

19. (8·5 × 6·5 cm.) Apart from one digression to Paardekraal, there seems to be no evidence of this type in the South-Eastern Lowlands area. It occurs at several sites in the Central Free State.

Winter's Rush.
Barkly West.
Kimberley.
Koffiefontein A.
Smithfield.
Aliwal North.

Steynsburg.
Graaff Reinet.
Aberdeen A.
Knysna.
Great Brak.
Mossel Bay.
Gouritz River.
Still Bay.

Dordrecht.
Paardekraal.

20. (9·1 × 4·7 cm.) This route first strikes across to Port Elizabeth, then along the coast as far as the Cape.

Smithfield.
Hofmeyr.

*Aberdeen B.

Cradock.
Somerset East.
Humewood.
Hankey.
Tzitzikamma Middens.
De Poort.
Knysna.
Westford.
George Coast.
Mossel Bay.
Gouritz River mouth.

At Gouritz the type changes to 10·0 × 4·3 cm. and continues:

Gouritz R. mouth.
Heidelberg.
Swellendam.
Villiersdorp.
Cape Hangklip.

There is a second change here to 9·7 × 5·1 cm., and this form occurs at Gordon's Bay and Stellenbosch, possibly ending its migration at Muizenberg.

It is likely that the 10·4 × 4·4 cm. type at Knysna represents a return movement of the changed type from Heidelberg. It does not occur farther east.

21. (8·0 × 4·5 cm.) This type shows a variation of less than two-fifths of an inch in its wanderings along much the same route as that outlined in 20 (and similar to 24). The type is slightly smaller than in 20. The central Free State distribution is not discussed.

* Possibly links with Knysna, also Hanover and Victoria West.

Central Free State.
Burghersdorp.
Cradock. Clarke's Siding.
Aberdeen. Somerset E.
Zuney.
Hankey.
Tzitzikamma Mountains.
Woodbourne.
De Poort.
Knysna.
Mossel Bay.
Bloembos.
Montagu.
Worcester.
Stellenbosch.
Ida's Valley.
Vlottenberg.

Notice the consistent movement inland (but still within the coastal belt), represented here by the step from Blombos to Montagu and Worcester. An analogous series is represented at Hanover, and occurs through the Trekveld area—what the relationship may have been I do not know. Probably both series originated in the Free State.

Southern Transkei.

A few additional examples outlining the routes to the Transkei may prove helpful, though the lines are short and links are sometimes unsatisfactory.

22. (12·4 × 8·3 cm.)

Koffiefontein A.
Smithfield.
Cathcart Downs.
Kingwilliamstown.

23. (9·2 × 7·8 cm.)

Avalon.
Fauresmith.
Cathcart Downs.
Happy Valley.
East London.
Debe Nek.

This is similar to the Kaaienveld type outlined as example 11, and the types may be linked in their origin in the Free State.

24. (11·4 × 5·3 cm.)

Hofmeyr.
Somerset East.

Humewood.	Fort Beaufort.
South End.	East London.
Tzitzikamma Caves.	
Belvedere.	
Mossel Bay.	
Heidelberg.	
West Langeberg.	
Gordon's Bay.	
Cape Flats.	
Cape Middens.	

These should be sufficient to demonstrate a route through Cathcart towards Kingwilliamstown, thus helping to fill the gap that the distributions given above may show. In the final example above, the sequence of the sites from Hofmeyr and on to Mossel Bay is much the same as that given in example 20 above, but the eastward route to East London is new.

Eastern Exit.

Our lack of knowledge of the prehistory of Basutoland makes it impossible to prove the existence of this route, but enough knowledge exists to permit the suggestion that the two Northern Transkei examples came by this road, and that the migrations did not proceed northward to feed Natal from there.

25. (14·0 × 7·0 cm.) This is an unusual form, and in such a case we can expect considerable variation. Examples of analogous shapes exist at Hoopstad and Douglas, but the Koffiefontein B iii (12·8 × 7·3 cm.) is the nearest to this Thabankulu stone. The difference in diameters is less than half an inch.

26. (10·7 × 7·4 cm.)

Central Free State (11·0 × 7·0 cm.).
Smithfield.
Aliwal North.
Xuka Drift.

The variation is 4 mm. or about one-sixth of an inch, and all specimens are related to the Orange River basin. This example is more valuable than the first, as distances are nowhere very great.

The suggestion is that the route lay along the upwaters of the Orange, and then cut across at Qacha's Nek, Ongeluk Nek, or over the Pack Ox Pass to the headwaters of the Kenegha and Tina affluents of the Umzimvubu. Such a hypothesis would explain the fact that

the Pondoland Smithfield types are closer to the Free State forms than are the Smithfield N series. No bored stones are associable, so far as I know, with the Pondoland material.

The Coastal Highway.

A few of the lateral movements along the southernmost coast of the continent may be considered briefly. Additional data may be sought under the examples given above, but we must here consider those movements that do not clearly emanate from inland sources. The example given under 20 above, suggesting the return of the 10·4 × 4·4 cm. type from Heidelberg (Cape) is instructive, as it demonstrates how an inland type may develop until it becomes a purely "coastal" form.

The south coast seems to have had a difficult history. There appear to have been two important focal areas of attraction, Knysna and the Cape Peninsula. The route between these will prove easier to disentangle than the Free State, as the valleys running parallel with the coastal belt are more definite than the low watersheds of the inland plateau.

Movement seems to have been partly lateral along the coast, partly lateral behind the mountain chains that provided independent pathways for migration, and partly transverse, by way of such rivers as reached the coast through the lattice of mountain ranges, the Sundays, Gamtoos, Groot, Gouritz, and others. The Breede River is an important highway, partly feeding the Cape of Good Hope through the Hinterland area, but at the same time providing a bypass directly across to the Sandveld and Swartland areas. In contrast the little Bot River valley (including the Palmiet and Swart Rivers), hemmed in by high mountains, is an isolated area with little real relationship to the outside world.

27. (10·0 × 7·5 cm.) This type has been discussed very shortly under example 16 above, and therefore must be regarded as having a possible inland origin.

Botha's Post.
Fort Brown.
Gamtoos River.
Knysna.
Swartberg.
Oudtshoorn.
Worcester.
Pinelands.

The journey between Oudtshoorn and Worcester quite certainly

passed behind the coastal ranges, and specimens of this type are absent at coastal sites west of Knysna.

28. (7·8 × 3·9 cm.) This is apparently a midden form, though reminiscent of an inland type, Winterveld viii at Hanover.

Cove Rock.
Uniondale.
Zuney.
Maitland Mines.
Tzitzikamma Mountains.
Woodbourne.
Mossel Bay.
Bloembos.

Conclusions.

Enough has been said in the previous pages to permit us to make certain generalisations regarding the peopling of South Africa in the Later Stone Age. So far as I know, the peopling of no country in the prehistoric world has ever been so exactly definable; and nothing but the bored stone could have yielded a series of routes, each capable of proof again and again, and each showing a remarkably logical course. Few of these routes could have been predicted from previous knowledge, yet each is demonstrably the obvious road for people with a localised knowledge, extending perhaps a hundred miles in any one direction, and entirely dependent upon hope and travellers' tales for knowledge of water-supply, vegetable foods, etc., in any direction of new migration. We may therefore epitomise some of our main discoveries, with a view to laying the foundations of a new branch of science, the study of migration through the medium of the bored stone.

1. There would seem to have been seven prototypes present in the northern parts of our known distribution. These with a few derivatives will adequately account for types in the Transvaal Region, the Natal Highlands and the Vet-Marico area.

2. The distribution of these seven prototypes in the Transvaal can be explained by two main migrations, one from the Vet-Marico to the Eastern Transvaal area, and one from the Central Transvaal to the Southern Transvaal area. The Central Transvaal reflects all types, and is therefore the cross-road.

3. It is possible that all types (excluding those from the Natal Lowlands) may have originated from these seven, though no attempt is made to demonstrate this in the present paper.

4. The peopling of the Natal Highlands took place almost exclu-

sively along the Wilge and Klip Rivers, to the upwaters of the Tugela and Buffalo Rivers from the Transvaal Region. These types did not originate in the Free State, and they do not exist south of the great Umzimvubu basin.

5. Nothing can yet be deduced regarding the Natal Lowlands, which may have been peopled from Moçambique, by way of the Zululand Lowlands.

6. While the Western Bypass provided a highway from Vryburg to Klaver and Calvinia, this route was fed by lateral movements over crossings of the Vaal between Barkly West and Douglas, and the neighbourhood of the Vaal-Harts junction, related to the Klein Riet River, and along the Kaap Plateau escarpment.

7. These last, and similar crossings of the Vaal, provided the types that reached Namaqualand. Their route follows the Orange River, though no demonstrable proof can be shown for continuity between Upington and Steinkopf. Identity of types at each end of this hiatus permits us to accept this route as a working hypothesis.

8. An alternative route from the Vaal-Harts, along the Kuruman and Molopo Rivers to Namaqualand, is suggested, but only negative evidence can here be adduced.

9. There is a great and important highway from the Transvaal, by way of the Vaal River, which has not been specifically discussed as the evidence is too obvious to be further laboured.

10. From this Vaal highway movements back and forth along the rivers of the southern Free State are common, and provide the material in the focal area of the Free State, which is cut off from the Transvaal by the Vet-Marico area.

11. Crossings of the Orange River, in the stretch opposite Hope Town (related to the Ongers and the Seekoei Rivers), fed only those routes that pass *west* of the Sneeuwberg (24° 30′ E. by 31° 45′ S.). From there access was gained to the Sundays River near Aberdeen and Jansenville, and to the Doorn River near Beaufort West. The types represented on these routes spread both east and west between the parallel mountain folds of the south, and seem only to have reached the coast at isolated points, such as the Sundays River mouth, Knysna, and Mossel Bay.

12. Crossings in the neighbourhood of Smithfield and Aliwal North provided routes that ran *east* of the Sneeuwberg, to feed the South-Eastern Lowlands by two routes, one related to the Great Kei, the other to the Great Fish River and the Bushmans River. From these routes the greater part of the southern coastal belt was fed, and these

migrations eventually give rise to most of the so-called "coastal midden types."

13. There is little real reason for divorcing these southern midden types from inland forms on a basis of either size or index. The differences appear to lie rather in the numerical proportions of the various types that are presented in each environment.

14. The Central crossing also provided routes that cut directly behind the south-eastern mountain ranges and south of the Sneeuwberg to build paths that often transgressed the routes feeding the south coast, running towards the Langeberg and the Breede River valley.

15. It is suggested that movements from the Free State, by way of the sources of the Orange River, passed over Qacha's Nek to the Matatiele district, to provide the Northern Transkei specimens, which do not agree with any Natal types immediately to the north. These movements missed the Southern Transkei, and did not penetrate Natal from the south. The Northern Transkei distribution will therefore probably prove itself to be an intrusive divide between the Southern Transkei and Natal, and is therefore important.

16. Types from the Prieska area and from the Western Bypass reached the Cape of Good Hope. The Prieska material does not transgress the 32° 30′ S. parallel.

17. Routes laterally from east to west (or sometimes conversely) can be traced along the southern coastal belt in two or three parallel paths, each confined along part of its course by either the coastal belt or by valleys between the first, second and third mountain folds.

18. These routes generally fed either the Breede or the Bot River valleys, both important as sources for types occurring in the Cape Hinterland, and at the Cape of Good Hope, either as Flats or as Midden types.

19. The same source supplied the Sandveld area; but it is noteworthy that the Swartland area shows no affinities with any known types in the rest of the Union.

20. The Cape of Good Hope seems to have been fed by a variety of streams from the east, coming either by way of the Heidelberg district, through the Bot River Valley, or from various similar sources through the Breede River valley and the Cape Hinterland. No material seems to have reached the Cape by any direct route from the north.

21. These migrations covered a long period of time. A first halt appears to have occurred at the Vaal River, after which spreads took place by way of the Vaal, and to Natal. A second and more important

halt on the main highway occurred at the Orange River, after which spread continued along the routes outlined in 11 and 12 above.

22. The period involved by the second halt is probably sufficient to account for the apparent late survival and advancement of Middle Stone Age types south of the southern mountain belt, such as the Still Bay, Howieson's Poort, and perhaps the Mossel Bay culture.

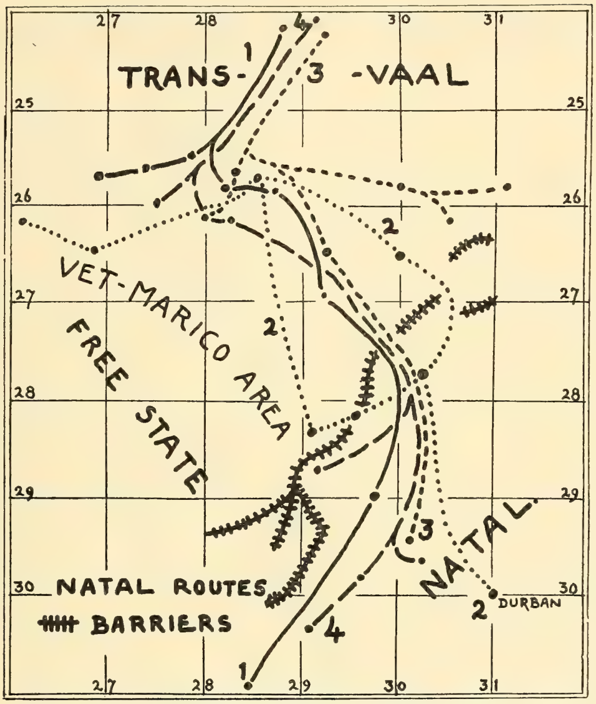
23. The Berg River valley, and the Olifants and Doorn Rivers, provide a wide and unknown belt between the Bokkeveld and areas farther south. No deductions can be made regarding this whole stretch, but it may eventually explain the anomalous Swartland types.

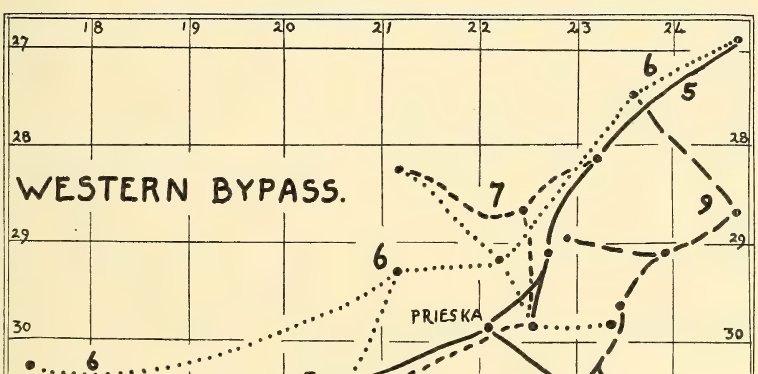
24. Much local work is needed to discover the habitual associations, not only of cultures, but also of *each type* of bored stone. I have suggested that two or even three different types may normally represent the stones made by a single culture. While the question of the differing sex of the users of digging-stones and knobkerries clouds the issue, this should eventually be cleared up in the field.

PART IV.—ELONGATED PREHISTORIC TYPES AND MIGRATIONS.

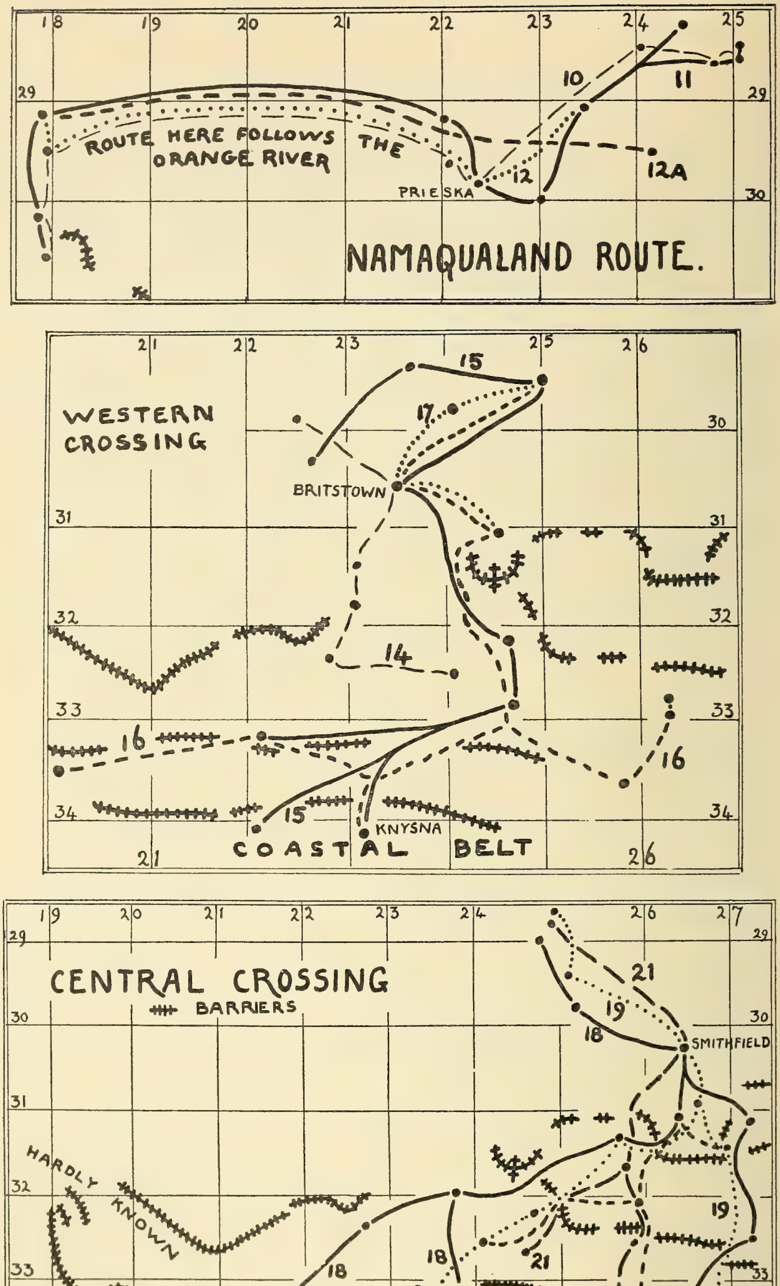
We have dealt with the circular and subcircular examples of the Prehistoric Series of bored stones, and have followed them in their migrations through southern Africa. We now discuss the elongated specimens. These are defined as those in which the length is greater than the width when casually inspected in plan. It has been found that 8 per cent. represents the difference immediately observable, and all the examples with a difference greater than this are listed here. In a few cases it is difficult to be certain whether a stone was intended to be circular or elongated, as subsequent breakage or use as a grinder may have reduced the width. In such cases a careful estimate of the original shape is made, and the missing figure given in brackets.

Certain questions arise in discovering the real relationship between the circular series and the elongated. How far can these be divorced from the circular series? Do they represent a variant that may appear at any period, or in any culture or environment? Do they represent a distinct cultural group or migration with a more limited distribution, and particular distributional routes? Were they made for the same uses as the circular examples? Is the elongated form the result of a scarcity of round pebbles or is it the result of deliberate

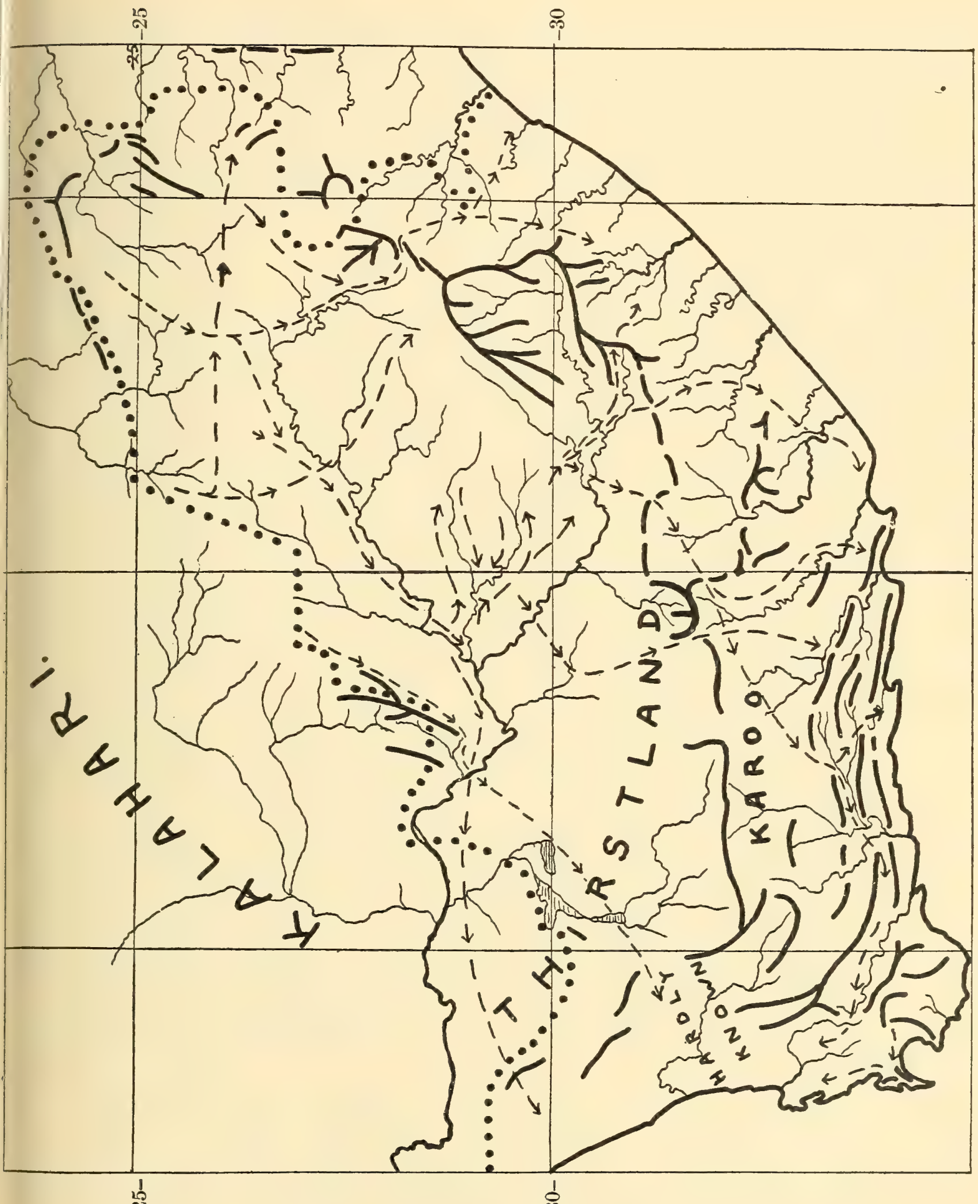




MAPS 7 AND 8.—Migrational Routes to Natal and to the Western Bypass.



Maps 9, 10 and 11.—Migrational Routes to Namaqualand, and by way of the Western and Central crossings of the Orange River.



Map 12.—Summary of main routes, barriers and area discussed. Heavy dotted line represents limit of known circular specimens.

choice? Are we perhaps dealing with a coastal type, used by people who have penetrated inland at various points?

I shall attempt to answer some of these points, or to suggest factors that may determine the eventual answer. For instance, it can be said at once that these are not variants that appear universally. The elongated series is the more localised, and in certain areas it is completely absent. We thus have some 44 examples from Smithfield and the Albert district presented by Dr. Kannemeyer, all of these are circular, none are elongated. In the same way, elongated forms only exist along one-sixth of the Western Bypass.

The suggestion that the elongated forms may be symptomatic of a separate migration is not excluded by the finding of round and elongated types in apparent association on the surface of sites or kitchen middens. The very few cases in which association is suggested by identity of museum accession number may be variously accounted for. Quite apart from culture contacts, merging, marriage or imitation, there are the difficult questions of chance association, and the habit of presenting examples to a museum in batches whose true provenance has been forgotten or muddled. This question of association must be watched by collectors, and documented by our museums. The limited distribution does suggest that we are dealing with a distinct cultural spread.

The elongated series does not present a coastal type. As in the case of the discs and flattened forms, this is a question of the proportions of types. Inland the elongated types are rare; at the coast they are somewhat more common. This might suggest that we are dealing with a coastal people who may have spread inland. Evidence from other parts of the continent would have to be considered, and F. Cabu and M. Van den Brande * show that the proportions of elongated to circular examples in the Congo is high. Material collected in the Southern Rhodesia Museum, and kindly submitted by Neville Jones, gives a very similar impression. These facts suggest that both sorts of bored stone originated inland and to the north of the Union.

Two facts point to the elongated forms being the result of a deliberate selection of elongated stones. One is that the circular examples were themselves selected for size; diameter and thickness were both important, and seemingly part of a tradition. The same can be shown for the elongated series, in which length and width were both im-

* "Contribution à l'étude de la répartition des Kwés au Katanga," Ann. Mus. Congo Belge, D, Série I, tom I, fasc. 4, 1938.

portant, though thickness was almost completely haphazard. It is obvious then that this form was a chosen type. In addition the distribution of the circular series includes the area of spread of the elongated. The abundance of circular specimens shows that circular pebbles were everywhere obtainable, if therefore there is any question of choice then circular types would have been the compromise forms.

Method.

We have not yet enough material to make use of the region and area system developed for the circular types, but specimens are grouped under a new set of regions that I have left somewhat indefinite, as future material is likely to increase these very considerably in almost any direction not limited by an adjacent region. No attempt has been made to group examples into types. Type averages are given, and grouping can generally be deduced by eye, or recourse to millimetre graph paper will supply the exact grouping.

These examples have three variables—length, width, and height or thickness. They should therefore be plotted three-dimensionally. This was originally done by grouping the specimens by one variable (the height), and plotting each group so obtained by the other two variables (length and width). Two very curious facts emerged from this study. It was first observed that height, or the thickness of the original stone, has little significance, and need only be taken into account when the stone is extremely thin, 1 or 2 cm., and the type is an elongated disc. The second discovery was that the proportion of length to width is slightly more important than the exact measurement of either. In plotting graphical distribution this means that the scatter tends to be leaf-shaped rather than circular, with its axis parallel to a diagonal representing certain proportions (generally 6 : 5).

Types have therefore been plotted by the first two figures only, height being ignored. It would possibly be helpful to develop an index, on the formula

$$\frac{\text{Width} \times 100}{\text{Length}},$$

and to plot this against either length or width. The cube is useless in assessing the type, as it is a product of height, which seems to have had as little significance to the makers as the height of a plug has to ourselves.

Regions have been altered to suit the distribution of elongated

types. The Thirstland here includes Namaqualand, while part of the previous Thirstland now becomes the Midlands area. I do not differentiate between the terms "region" and "area" as was done in the previous section, as I do not regard the difference as important here. The areas are generally wide enough to be regarded as regions, and any further subdivision can wait until more material accumulates.

The Material.

The columns given below represent length, width, height, cube, maximum diameter of mouth and maximum diameter of the centre of bore. To these may be added the weight and any comments.

Before proceeding to the bulk of the material at our disposal, we may list a few examples from isolated areas.

Mbabane, Swaziland.							
MMK 911 .	9·3	8·1	6·1	460	3·8	2·7	Schistose rock.
	8·5	6·9	5·8	340	3·0	2·6	Rolled. Igneous rock.
Kuruman-Groenwater Rivers. Kuruman.							
MMK 961 .	14·2	12·9	6·3	1155	4·5	2·5	Fine white Ss.
Griquatown.							
MMK 165 .	14·2	11·3	7·0	1125	4·0	3·2	

The larger Mbabane example agrees well with the second Transvaal type. The Kuruman and Griquatown specimens form members of a single group that may be related to Natal and Cape Peninsula types, but might just as easily belong to the MaNtatisi migration, to be discussed later.

Transvaal.

Material from the Transvaal proper and from the Upper Vaal has been grouped together. I have here included seven examples that I originally listed as Bantu, as they fit more clearly into the present series. Only one of these was actually found with a Bantu specimen, from Ohrigstad.

Messina.*							
HAC 1248 .	16·5	13·8	5·0	1140	4·5	3·6	1·5 kg. Weathered schist.
1247 .	15·3	12·0	3·5	645	3·4	1·4	1·2 kg. Basic schist.
(1249 .	13·0	9·4	4·5	550	3·5	1·8	0·8 kg. Quartzite.)
(1250 .	12·2	9·7	4·0	475	3·8	2·0	0·57 kg. Yellow schist.)

* These four specimens formed part of the original Geological Museum Collection. The first pair are known to be from Messina district, twelve miles from the Limpopo

OHRIGSTAD.							
PEM 615/J .	11·8	10·2	4·2	505	3·2	1·9	Possibly Bantu, submitted to P.E. Mus. with a Bantu example.
ROOSSENEKAL.							
WUA 1155 .	15·6	12·0	8·6	1600	4·3	2·4	
Univ. Stell. .	16·2	12·2	7·2	1425	5·4	2·4	
LYDENBURG.							
WUA 313 .	10·4	7·9	6·1	500	2·6	. .	1·15 kg. Ironstone.
A/34 .	6·5	5·5	4·2	145	3·3	2·0	0·23 kg.
SANNIESHOF, LICHTENBURG.							
ASJ 29/42 .	11·7	10·3	6·8	820	4·0	2·2	Wonderstone.
GREENLANDS, VREDEFORT.							
ASJ 8/41 .	7·1	6·3	3·9	175	2·4	1·2	1 foot deep. Unassociated.
HEILBRON.							
ELM 36c .	11·7	10·0	6·0	700	3·5	2·0	1·03 kg.
TAUNGS.							
AMG 1890 .	11·3	10·0	7·0	790	5·5	3·3	
SHEPPARD ISLAND.							
ASJ 7/35/48 .	9·7	8·0	9·3	720	3·2	2·9	Under 3 feet of gravel.
Averages: i.	16·5	13·8	5·0	1140			
ii.	15·7	12·1	6·4	1225			
iii.	12·0	9·9	5·4	640			
iv.	10·0	8·0	7·7	610			
v.	6·8	5·9	4·1	160			

It seems clear that this small series is by no means representative of a prehistoric population of normal density. Either these people merely passed swiftly through this area, or a vast work still remains to be done here.

SOUTHERN ORANGE FREE STATE.

WINDSORTON.							
SAM 1829 .	13·0	11·4	9·3	1280	6·4	3·8	
RIETPAN.							
MMK 684 .	6·3	5·4	3·6	122	2·8	0·5	Ss.
DOUGLAS.							
SAM 06 .	6·3	5·0	4·5	142	3·6	2·5	
PHILIPPOLIS.							
ASJ — . .	8·9	7·0	4·3	270	3·6	2·4	

River. From the entry Dr. Harger presumes that 1249 and 1250 are from the same part. The provenance is therefore uncertain, but we may include them here as products of the same geological excursion to the Northern Transvaal.

KOFFIEFONTEIN.							
MMK 1412 .	13·8	11·5	3·3	530	3·2	1·8	
1310 .	7·9	6·9	6·0	325	3·5	2·0	Ss.
WUA 1100/C	8·5	7·6	4·9	320	3·8	1·7	0·47 kg.
MMK 1657 .	6·1	5·1	3·8	118	3·5	1·8	Ss. Flared bore.
1432 .	5·2	(4·6)	4·2	100	2·8	1·2	Ss. Damaged.
STRYDPOORT, JAKOBSDAL.							
WUA 975 .	8·0	6·8	6·0	430	3·9	2·2	0·42 kg.
AVALON.							
ASJ 9/38/10 .	9·0	6·1	7·3	400	4·6	2·8	Two opposed faces flattened. Eccentric hole. Smithfield B associations.
MAFETENG.							
SAM 3183 .	12·9	10·6	7·4	1010	4·2	..	Started.
BUTHABUTHA.							
SAM 1758 .	7·7	6·8	4·1	215	4·0	2·1	Shale.
Averages: i.	13·2	11·2	6·7	950			
ii.	8·9	6·9	5·5	350			
iii.	7·8	6·8	5·4	290			
iv.	6·0	5·0	4·5	135			

There is little agreement between these averages and those above, but the second Swaziland example fits type ii, though no deduction can be made, on account of distance. Types ii and iii seem to form a pair.

THIRSTLAND.

PRIESKA.							
Sharples 5 .	8·1	6·6	(1·5)	..	1·4	0·6	Micaceous shale. Deep radial scoring by rodent. Anomalous.
GROOTENAUTE, PRIESKA.							
SAM 5028 .	12·0	10·5	6·7	850	5·3	2·6	
BUSHMANLAND.							
SAM Bain .	11·7	9·0	4·7	495	4·0	3·2	Hammer.
STEINKOPF, NAMAQUALAND.							
NMP 2342/1 .	11·5	10·0	7·6	875	4·7	2·9	1·5 kg.
2342 .	9·1	7·6	7·2	500	5·0	2·3	0·76 kg.
2586 .	10·2	6·5	7·0	465	4·5	2·6	0·65 kg.
2580 .	8·4	6·7	7·5	420	3·8	2·2	0·69 kg. Oval hole, 3·1 × 2·2 cm.
2342/A.	7·8	6·2	5·7	275	3·4	1·8	0·47 kg.
BRITSTOWN.							
Heese Coll. 20	11·3	9·7	6·9	755	3·5	2·1	1·16 kg. Grinder, Hammer.
16	11·3	10·4	6·2	750	5·5	2·5	1·05 kg. Quartzite.
24	10·0	7·3	4·1	300	3·6	2·1	0·45 kg. Pebble.

CARNARVON.							
AMG 689 .	11·9	9·2	8·3	920	6·2	4·2	Two sides flattened by hammering. Elliptical hole. Striated from top to bottom.
SUTHERLAND.							
Drennan Coll.	8·7	7·2	5·0	315	3·3	..	Ss. pebble.
BEAUFORT WEST.							
MMK 1103 .	4·7	3·9	2·0	37	2·0	1·1	Anomalous.

The Beaufort West example is anomalous, and is most probably a circular type (the bead type so typical of the area) made from an elongated stone. The anomalous types are not employed in taking averages.

Averages:	i.	11·5	10·2	6·9	810
	ii.	11·8	9·1	6·3	708
	iii.	10·1	6·9	5·5	390
	iv.	8·5	6·9	6·3	380

These averages immediately suggest the route by which Namaqualand was reached, through the dry country to the west, or along the Orange to Steinkopf.

NATAL.

UMHLOTI BEACH, DURBAN.							
A. G. Wills 4.	10·2	8·1	4·8	400	3·1	..	Gritty Ss.
WEENEN.							
N.M.P. 2824	12·3	9·3	8·2	925	5·7	2·4	
908	11·9	9·6	5·6	645	5·1	2·1	
KRANSKOP-GREYTOWN ROAD.							
SI 27 . .	11·3	9·5	4·3	455	3·1	0·8	
RICHMOND.							
SI 12 . .	15·5	11·2	6·6	1145	4·6	2·1	
"NATAL."							
NMP — .	14·0	12·4	7·6	1320	5·5	1·5	

Averages:	i.	14·7	11·8	7·4	1230
	ii.	11·8	9·5	6·0	675

The first group is unsatisfactory, but straddles the scatter of the second group in the south-eastern area almost exactly. This may be important in discussing migration.

MIDLANDS.

This area is essentially an inland area of migration, and has been chosen to represent the variation within a single type. The type

(Nucleus 4) is reflected in slightly differing averages in surrounding areas to the east and south, and this Midlands area overlaps the South-Eastern and the Southern Forests Regions to some extent.

VENTERSTAD.							
Univ. Stell. .	11·5	10·0	(4·3)	500	3·8	2·8	Both faces worn. Soapstone.
STEYNSBURG.							
ASJ 61/36 .	10·9	9·8	5·9	630	4·2	2·7	Shale.
LADY FRERE.							
ELM 42 .	11·5	9·7	5·0	560	3·5	2·2	1·02 kg. Grinder.
HUXLEY, STUTTERHEIM.							
ELM 76 .	10·5	9·0	4·5	435	4·0	2·2	0·68 kg.
GRAAFF REINET A.							
AMG 2448 .	10·9	9·5	7·1	735	3·6	1·8	Hammer. One side flattened.
ABERDEEN.							
ELM 72 .	11·5	9·8	4·5	505	3·5	2·2	
KIRKWOOD, SUNDAYS RIVER.							
Mossop Coll. .	11·9	10·6	6·6	835	4·5	3·0	
SCHOENMAKERS, PORT ELIZABETH.							
PEM 615/L .	11·3	10·3	7·3	840	4·7	2·7	1·02 kg.
MAITLAND MINES FARM.							
PEM 615/A .	10·8	9·4	5·3	540	4·8	2·1	0·67 kg.
FERNDALE, HUMANSDORP.							
ELM 80 .	11·0	10·0	5·0	550	3·5	2·2	0·8 kg.
Average:	11·2	10·0	5·8	640			

The limits of variation from the average are seen to be: Length, 0·7 cm.; Width, 1·0 cm.; Height, 1·5 cm.

Note the slight change in width, and the wide range in height, 4·3 to 7·3 cm. Analogous types can be followed at Alicedale, Cambridge, etc., with a wider variation in some dimensions. They have been included under other regions, but prove the presence of a single widespread cultural type. This suggests that any attempt to associate and isolate this type definitively must be undertaken in the Eastern Province of the Cape of Good Hope. A careful listing of associable material, including paintings, etc., should be of very great help to us in the future.

SOUTH-EASTERN REGION.

ROSMEAD.							
PEM 614/F .	14·2	12·3	6·9	1205	4·2	1·7	1·65 kg.
STRATTON, QUEENSTOWN.							
ELM 91 .	16·0	9·0	7·0	1010	4·5	2·2	2·04 kg. Anomalous.

THORNEYCROFT, QUEENSTOWN.							
ELM 92 .	15·0	13·2	6·5	1290	5·0	1·7	2·3 kg.
74 .	13·5	11·5	6·0	930	4·0	2·2	1·37 kg.
HAPPY VALLEY, CATHCART.							
ELM 95 .	16·2	14·3	7·5	1725	5·0	2·5	2·7 kg.
BREAKFASTVLEI, KINGWILLIAMSTOWN.							
ELM — .	14·5	12·0	5·5	975	4·0	2·7	1·75 kg.
FERNDALE, KOMGHA.							
ELM 105 .	15·0	12·7	6·5	1240	4·0	2·0	2·22 kg.
39 .	7·0	5·5	4·7	180	2·8	2·2	0·45 kg.
BASHEE RIVER.							
TMP 7538 .	9·5	5·1	6·9	335	4·6	0·9	Anomalous.
CAMBRIDGE, EAST LONDON.							
ELM 35 A. .	18·0	11·8	4·0	850	4·0	2·7	1·3 kg. Horseshoe. Anomalous.
35 B. .	11·5	9·5	4·0	435	2·5	1·7	0·93 kg. Quarry.
EAST LONDON.							
MMK 2805 .	15·0	11·3	4·0	680	4·4	1·6	
ASJ — .	12·0	9·3	5·0	560	5·3	2·0	
ELM 46 .	8·7	6·8	4·5	265	3·5	2·5	0·34 kg. Fort Glamorgan.
— .	6·0	5·0	3·5	105	2·0	1·5	0·23 kg. Buffalo River, West.
FORT BEAUFORT.							
ELM 48 .	7·0	6·0	3·5	150	2·4	1·5	0·23 kg. Ss.
BEDFORD.							
PEM 614/E .	7·5	6·7	4·3	215	4·1	1·9	0·29 kg.
GRAHAMSTOWN.							
AMG 2980 .	15·7	13·6	6·5	1390	5·5	3·0	
.	13·7	12·0	8·0	1315	6·5	3·4	Unshapely.
UNIONDALE, ALBANY.							
AMG — .	8·3	7·2	4·0	240	4·9	2·0	Irregular.
ALICEDALE.							
PEM 614/Y .	14·9	12·3	12·4	2275	5·7	2·2	2·2 kg. Very thick.
.	11·5	9·7	6·9	770	4·4	2·4	1·06 kg.
AMG 1643 .	11·5	8·8	6·8	690	5·4	2·0	
MIMOSA.							
SAM — .	13·7	11·8	7·5	1220	5·4	2·9	Zuurberg lava.
KLEINPOORT-COEGA ROAD A.							
PEM 614/c .	12·7	11·4	4·8	695	5·0	..	1·01 kg.
Averages: i.	16·0	13·9	7·0	1560			
ii.	14·7	12·5	7·5	1395			
iii.	13·4	11·7	6·4	910			
iv.	11·6	9·3	5·7	615			
v.	8·2	6·9	4·3	240			
vi.	6·7	5·5	3·9	145			

Note the extraordinary range of thickness in type ii (5·5 to 12·4 cm.). The Kleinpoort-Coega Road site has been split, as this is obviously at about the point of junction of the two areas, South-East and Southern Forests. The Rosmead example comes from some distance outside this area, but it fits well with the Queenstown, Breakfastvlei, Komgha, and East London specimens in this group. It shows no relationship to the Midlands type.

Southern Forests.

Kleinpoort-Coega Road B.							
PEM 614/c. .	9·0	7·8	4·9	505	3·5	2·2	0·8 kg.
Tzitzikamma Middens.							
PEM 94 .	13·5	9·3	4·5	565	(8·3	2·3)	0·8 kg. Conical bore. Anomalous.
	8·7	7·0	5·3	325	4·6	2·3	0·43 kg.
Plettenberg Bay.							
SAM 1660 .	12·4	9·0	1·6	180	3·0	2·0	Shale disc. Anomalous.
Robberg Caves.							
SAM 2849 .	9·4	7·4	5·5	385	3·9	1·9	Ss. Midden.
Univ. Stell. .	12·4	9·0	2·6	290	2·8	1·5	"Propellor shaped."
ASJ 11/41 .	8·9	7·4	2·5	165	4·4	2·1	Elliptical hole.
Knysna.							
Robinson Coll.	15·3	12·3	7·5	1410	4·2	3·1	Coarse Ss. Erratic.
SAM Bain .	(12·5)	10·2	8·1	1035	4·2	2·4	Coarse Ss. Broken. One face flattened before boring.
UCT — .	11·7	10·1	6·0	710	4·0	2·6	Coarse Ss.
Robinson Coll.	12·5	9·4	5·8	680	3·7	2·0	Sandy shale.
	11·1	9·6	4·2	450	3·9	2·8	Sandy shale.
SAM 4895 .	11·0	8·3	4·9	445	3·4	2·6	Ss.
Robinson Coll.	9·8	7·0	4·3	295	4·0	2·1	Ss.
	9·1	7·9	3·2	230	2·9	1·8	Ss.
Sharples 3/ .	9·9	5·8	4·1	230	2·5	1·9	Anomalous.
Dripping Well, Knysna.							
Robinson Coll.	11·3	10·0	7·2	815	4·6	..	Surface quartzite.
Wilderness.							
UCT —/43 .	12·0	10·1	(6·0)	730	4·7	2·9	Split. Witteberg Ss. Midden.
Oudtshoorn.							
Pocock Coll. .	11·7	7·7	6·3	570	3·6	2·1	
Graaff Reinet B.							
F. Malan Coll.	12·1	9·0	5·4	600	4·2	2·0	Grinder. Ss.
Mossel Bay.							
HHC (Black).	11·5	9·3	4·0	430	5·1	2·4	TMS pebble.
SAM — .	8·2	7·0	4·9	280	3·2	..	

DOORN RIVER, BARRYDALE.							
SAM 173 .	12·4	9·6	6·5	775	5·5	2·4	Compare South Coast, average i.

Averages:	i.	15·3	12·3	7·5	1410
	ii.	11·8	9·9	5·7	670
	iii.	12·3	9·2	5·1	585
	iv.	11·3	8·0	5·6	510
	v.	9·0	7·4	4·4	312

Types ii and iii are obviously the commencement of a division in the Midlands type (11·2 × 10·0 × 5·8 cm.). We will watch the larger of the two develop further in the South Coast area. Note the inclusion of Barrydale in the present area. Type v appears to be a consistently midden variety.

SOUTH COAST AREA.

BRANDWACHT, MOSSEL BAY.							
SAM .	12·4	10·3	5·5	700	5·5	..	
MELKHOUTBOS, ALBERTINIA.							
HHC 1056 .	10·5	9·0	7·8	345	4·0	2·2	0·52 kg. TMS.
BLOEMBOS.							
Heese Coll. 23	9·0	7·8	7·1	500	3·8	2·5	Quartzite pebble.
RIVERSDALE.							
Heese Coll. 22	13·0	11·0	6·8	905	4·3	2·2	Quartz pebble.
25	8·5	7·4	3·8	140	3·2	2·5	0·28 kg. Ss. pebble.
13	7·0	6·3	2·4	106	2·1	1·3	0·17 kg. Quartzite.
CAPE INFANTA.							
F. Malan Coll.	11·1	8·4	5·5	515	4·2	..	
CAPE AGULHAS.							
ASJ 29/46/2 .	12·7	10·8	4·4	550	4·6	2·6	
	12·4	10·8	3·9	520	4·2	2·5	
HET BOSMANSPAD, SWELLENDAM.							
SAM 183 .	12·3	10·5	7·9	1020	4·6	2·6	
SWELLENDAM.							
SAM 181 .	12·4	10·6	4·6	605	3·8	1·9	Compare Barrydale.
	10·2	8·6	5·4	475	4·2	2·0	
	9·0	7·7	3·5	245	2·8	2·0	
	6·0	4·1	0·5	(12)	2·0	0·5	Anomalous disc.
MONTAGU.							
SAM 5018 .	12·0	10·5	5·6	705	4·5	1·6	Ss. Grinder.
	9·1	7·6	3·6	250	3·2	2·1	Ss.
CERES.							
SAM 5013 .	12·5	10·4	3·6	470	4·5	2·5	TMS.
HERMANUS.							
SAM — .	9·5	8·2	3·7	290	4·2	..	

GORDON'S BAY A.							
Univ. Stell. .	12·2	10·8	8·7	1145	3·6	..	
F. Malan Coll.	12·3	10·7	7·2	950	5·9	..	
	(6·0)	5·1	1·1	..	2·3	1·2	Oblong slate disc. Battered.
Jardine Coll. .	7·3	5·1	2·9	108	2·5	1·3	
Averages: i.	12·4	10·6	5·0	645			
ii.	10·7	8·5	5·4	495			
iii.	9·0	7·6	3·6	245			
iv.	6·4	4·8	1·5	50			

I have divided Gordon's Bay into two series. The last two examples fit in well with the third specimen given from Swellendam. It might have been as appropriate to divide Swellendam, and bring this single example into the Steenbras-Palmiet Area.

STEENBRAS-PALMIET RIVERS.

VILLIERSDORP.							
UCT —/43 .	11·2	10·0	8·3	930	5·5	2·5	Tertiary Ss.
	11·5	10·0	6·2	715	4·4	2·5	TMS.
A. M. de Villiers .	11·0	9·5	6·1	635	4·2	2·2	TMS pebble.
UCT —/43 .	10·5	9·3	4·6	495	3·7	1·9	Ss. pebble. Two faces ground to an edge.
A. M. de Villiers .	8·1	6·8	4·7	315	3·5	2·0	TMS pebble.
KOGEL BAY MIDDENS.							
WUA 256 .	9·9	7·3	5·0	365	4·4	1·5	0·51 kg.
HANGKLIP.							
Univ. Stell. .	13·5	10·2	3·8	525	4·0	2·1	Erratic.
HAWSTON.							
MMK 1253 .	17·8	11·2	6·8	1995	4·8	2·4	Ss. Anomalous.
.	10·4	7·3	6·2	470	4·2	2·7	Ss. Hammer at ends.
CALEDON COAST.							
Drennan Coll.	13·6	12·0	5·5	900	4·6	2·4	Ss. Midden, found with small conical based pot.
GORDON'S BAY B.							
MMK 420 .	15·4	11·8	7·9	1815	4·7	2·3	Erratic, *cf.* Knysna.
F. Malan Coll.	11·3	9·4	6·1	648	4·1	..	
Univ. Stell. .	12·7	9·2	5·3	615	4·0	1·1	Anomalous.
F. Malan Coll.	9·2	7·3	6·8	455	4·6	..	Uneven grey Ss.
	11·0	8·9	4·5	440	2·8	1·8	TMS.
Univ. Stell. .	9·4	7·2	5·8	395	3·8	1·6	
	9·0	7·3	5·3	350	4·6	2·0	
Jardine Coll.	11·4	9·2	3·2	335	4·1	2·2	
Univ. Stell. .	10·5	9·7	2·7	275	3·9	3·1	
	7·8	6·5	5·3	275	2·7	..	Started.
	10·1	8·0	3·3	265	2·1	..	Merely started.
F. Malan Coll.	8·8	6·8	4·4	265	3·8	2·0	Grey quartz-veined shale.

STELLENBOSCH.							
PEM 614/K .	13·2	11·6	8·9	1355	5·1	..	1·8 kg.
Drennan Coll.	13·9	12·4	5·8	1020	4·6	2·4	TMS. pebble.
UCT 27/15 .	10·6	7·5	6·5	515	3·6	..	TMS.
Averages: i.	13·5	12·0	6·8	1090			
ii.	13·1	9·7	4·6	570			
iii.	11·0	9·5	5·2	560			
iv.	10·4	7·6	5·3	415			
v.	9·2	7·3	6·0	400			
vi.	8·2	6·7	4·8	285			

The anomalous and erratic examples are not included.

SWARTLAND-SANDVELD.

CLANWILLIAM.							
SAM Bain .	11·5	10·0	5·5	635	5·5	2·3	
	8·0	5·8	4·8	225	3·4	2·8	
	9·0	8·0	2·8	200	2·2	1·8	Subrectangular.
SALDANHA.							
UCT — .	13·6	10·6	5·7	820	3·1	2·6	
MMK 1499 .	7·1	5·4	5·8	220	3·4	2·1	Ss. Grinder.
MELKBOSSTRAND.							
SAM 5016 .	9·4	8·0	3·5	265	4·7	2·5	Malmesbury shale.
WELLINGTON.							
SAM — .	11·5	10·0	5·1	585	5·0	2·4	TMS. pebble. Grinder.
GROENBERG, WELLINGTON.							
F. Malan Coll.	13·7	11·0	8·5	1280	4·8	1·7	TMS.
NABYGELEGEN, WELLINGTON.							
F. Malan Coll.	5·1	4·2	1·0	(21)	1·7	0·8	Disc. Anomalous.
GOEDEHOOP, WELLINGTON.							
F. Malan Coll.	10·5	8·9	6·4	590	4·8	2·0	Erratic. Steenbras-Palmiet.
	7·0	5·7	3·8	152	3·2	1·8	
Averages: i.	13·7	10·8	7·1	1050			
ii.	11·5	10·0	5·3	610			
iii.	9·2	8·0	3·2	230			
iv.	7·4	5·6	4·7	200			

There is a general resemblance to the Steenbras-Palmiet area (to which type ii shows a particular resemblance) and also with the Thirstland and Midlands. Type i resembles a Cape Peninsula type.

CAPE PENINSULA.

LAMBERT'S BAY.							
SAM —	14·6	12·5	3·5	640	3·8	..	
BLOEMBOS, DARLING.							
SAM 784 .	12·0	10·0	5·0	600	6·0	2·1	TMS. pebble. Wilton.

MALMESBURY.							
NMP 2599 .	14·5	11·0	5·6	950	3·6	1·9	1·7 kg.
BAIN'S KLOOF.							
NMP 2581 .	13·0	11·0	9·2	1315	7·8	1·9	2·13 kg.
WOLSELEY.							
PEM 615/E .	12·2	9·1	4·4	490	3·8	1·9	0·69 kg.
VLOTTENBERG.							
UCT 44/4 .	14·2	11·0	6·7	1045	4·2	..	Ss.
KLIPKOP, PAROW.							
SAM 5011 .	13·7	10·2	4·7	655	4·3	..	TMS. pebble. Burial.
5012 .	12·8	11·1	4·5	640	4·4	1·6	TMS. pebble. Burial.
5011 .	11·8	9·3	4·5	495	4·5	2·3	TMS. pebble. Burial.
ORANJEZICHT, CAPE TOWN.							
SAM 4999 .	8·7	6·4	3·6	200	3·2	1·6	Ss. pebble. Grinder.
HOUT BAY MIDDENS.							
SAM 4777 .	12·5	10·2	8·1	1025	5·1	2·8	TMS. pebble.
	17·2	12·5	4·6	975	5·5	1·9	Shale pebble.
4750 .	13·9	10·5	5·7	880	5·3	2·2	TMS. pebble.
4777 .	13·0	11·3	4·3	655	4·4	..	TMS. pebble.
UCT 27/18 .	16·0	10·5	1·8	300	1·8	1·0	Slate disc. Anomalous.
SAM 4777 .	9·0	7·5	2·9	196	3·2	..	TMS pebble.
NOORDHOEK MIDDENS.							
Mossop Coll. .	10·4	(8·6)	7·8	700	4·0	2·2	Purple Ss.
KOMMETJE MIDDENS.							
SAM 3831 .	10·6	9·0	6·4	610	4·3	2·4	TMS. pebble.
CAPE POINT.							
SAM Martin .	14·0	12·4	4·8	835	3·8	2·3	Greenish shale.
SIMONSTOWN.							
SAM Martin .	14·6	12·0	6·6	1155	4·0	2·4	
FISH HOEK.							
J. B. Gordon .	10·5	8·8	4·6	425	2·9	1·9	TMS.
SAM Peers .	10·2	7·3	3·4	255	3·9	2·0	Shale. Grinder.
	8·3	7·0	3·4	198	3·5	2·3	Shale. Waterworn.
SMIT'S FARM, FISH HOEK.							
Mossop Coll. .	10·0	7·5	4·4	330	3·4	1·7	5 feet deep. Grinder.
ST. JAMES.							
UCT 44/5 .	8·4	7·6	5·3	340	3·8	..	Ss. Used as hammer. Station House Garden.

CAPE FLATS.							
SAM 605 .	16·5	14·5	10·0	2395	3·5	2·5	Outsized. Anomalous.
Lister	15·8	12·0	3·8	720	4·8	1·9	
1243 .	12·0	10·0	6·0	720	3·6	1·5	
AMG 2419 .	12·7	9·0	5·7	650	4·8	2·0	Pointed stone. Oval hole.
SAM Bain .	14·6	(11·4)	3·5	585	3·5	3·1	Laterally flattened.
402 .	10·5	9·2	5·7	550	4·2	2·2	
Bain .	10·5	9·1	5·1	490	3·5	2·1	
	9·5	7·5	3·7	265	4·0	2·0	
	10·0	8·8	2·0	175	2·1	1·7	
PHILIPPI.							
Arends Coll. .	13·0	11·2	6·8	990	4·2	2·5	12 feet deep in sand. Oval hole.
PRINCESS VLEI.							
Mossop Coll. .	14·5	10·3	4·6	685	4·0	2·2	Skew bored.
VICTORIA HOSPITAL, PINELANDS.							
ASJ — .	10·0	8·8	2·2	195	3·5	2·5	
NEWLANDS.							
SAM Camp .	13·3	10·4	4·0	550	4·0	1·6	Shale pebble.
CONSTANTIA.							
Jager Coll. .	12·0	9·5	(7·6)	865	5·0	3·0	
TOKAI.							
SAM — .	14·0	10·0	3·0	420	4·5	2·8	Irregular.
Averages: i.	16·5	12·2	4·2	850			
ii.	14·5	11·9	4·8	535			
iii.	12·9	11·2	6·1	675			
iv.	13·9	10·3	4·4	638			
v.	12·2	9·6	5·9	565			
vi.	10·3	8·9	4·8	450			
vii.	9·7	7·4	3·6	260			
viii.	8·5	7·0	4·1	245			

Only type ii seems to have a peculiar distribution, *i.e.* Lambert's Bay, Malmesbury, Cape Point, Simonstown, and a single example from the Cape Flats. Type viii may be a divergent from type vii. The St. James example, presented by A. R. E. Walker, is nearly circular, and may be a slightly elongated variant of the circular type, CH. xi.

Comparative Distribution of Elongated and Circular Forms.

Material is listed opposite the areas used above for the elongated forms. These are not directly comparable with the regions and areas used for circular forms, but the areas given here for the circular types are those that most nearly coincide. The first column of figures gives the total of elongated specimens; the central column shows the

distribution of circular forms in component and comparable areas, while the final figure gives the total. A few additional circular forms have been submitted too late for inclusion in the list. No new elongated forms are known.

Area.	Elongated.	Circular by Areas.	Circular.
Kuruman-Groenwater .	2	17	17
Transvaal-Swaziland .	15	9 + 29 + 18 + 17 + 26 + 11 + 20	130
Southern Free State .	13	59 + 18 + 23 + 33 + 17 + 5 + 18	173
South-East Free State .	0	45	45
Upington-Hartbees .	0	14	14
Bokkeveld	0	6	6
Thirstland	14	24 + 15 + 25 + 8	72
Natal	6	23 + 9	32
Midlands	10	7 + 9 + 22	38
North Transkei . .	0	2	2
South-East region .	25	19 + 13 + 14 + 13 + 21	80
Southern Forests . .	23	5 + 11 + 3 + 19 + 82 + 10	130
South Coast . . .	22	44 + 18	62
Gouritz-Karoo . .	0	13	13
Steenbras-Palmiet .	25	24 + 10 + 41	75
Swartland-Sandveld .	11	27 + 5	32
Cape Peninsula . .	39	17 + 53	70
TOTALS .	205		991

MIGRATIONS.

It will be remembered that, in discussing the Transvaal circular types, it was shown that there are seven prototypes to be discerned in the Transvaal and the Vet-Marico area. These persist and can still be recognised in Natal and the Vaal River areas, but in the Free State the picture becomes blurred. There seems to have been a stoppage, a period of lateral movements that gave rise to new forms, with little or no attempt to cross the Thirstland to the south of the Orange. It was therefore found convenient for us to regard those types that eventually crossed the Orange southward as deuterotypes, though these were not clearly isolated.

In our study of the elongated series the picture is very different, and to account for those differences we shall have to assume that the cultural migrations that first brought the elongated types into the Union were different in origin from those that brought the circular types, whatever may have been the eventual results of mixture.

In the elongated series there are (oddly enough) seven prototypes. These are arrived at by a method somewhat different from that

employed to develop the Transvaal prototypes for the circular series, and I have therefore called them "nuclei." These may not all have entered the Union at the same point or within the same area, but our knowledge is limited by present lack of evidence.

The first point of interest is that these nuclei persist over a far wider area than the seven prototypes. As will be seen when we discuss the "Age and Area" hypothesis, there can only be one explanation for this persistence; that spread was faster and was not hampered by any period of delay in the Free State, nor by deferment of the crossing of the Thirstland southward. This itself needs explanation. The earlier spread was hampered by the dangers of the Thirstland and the unknown peril of pressing farther and farther into what might prove to be an increasingly arid area. In addition, it would be faced by hostile remnants of the Middle Stone Age peoples to the south. Some period of consolidation and of reconnaissance was essential. In contrast, any later spread by a friendly incoming culture could have followed freely without these inhibitions, probably by what had become a well-marked and well-known route. This gives us reason to presume that the circular types are the earlier, and the elongated are later. Slight contributory evidence lies in the fact that a greater proportion of circular specimens lie buried at depth in different parts of the Union. To the north, in the Congo, both types of bored stones seem to be found persistently at depth, and to precede the later Neolithic period, according to Dr. F. Cabu, and no differentiation has yet been attempted. M. Janmart finds the bored stones of N.E. Angola under the youngest gravels on bedrock.

To take the matter a highly speculative step farther, it may eventually be possible to suggest that the circular types were the tools of the vague physico-cultural-linguistic "Bushman" group, while the elongated types may similarly be attributable to the equally vague cultural-physical-linguistic "Hottentots." Whether or not they will ever prove to be associable with Smithfield-bearing and with Wilton-bearing cultural groups remains to be seen. This is here put forward for what it may eventually prove to be worth. Much still remains to be said for the logical steps that have led me towards making the more legitimate suggestions set out above.

The Seven Nuclei.

We exclude the South Coast, Steenbras-Palmiet, Swartland, and Cape Peninsula areas for the present, as these are the farthest from

any point of entry into the Union, and are therefore to be regarded as later and derived forms. Our discussion will for the moment be confined to the remaining areas, east of Mossel Bay, and north of about 33° S.

If we take all the averages that we have already developed, excluding anomalous types, for this part of the Union we find that there are seven nuclei of averages on our graph. These nuclei are made up as follows:—

1.		16·5	13·8	5·0	1140	Transvaal.
		16·0	13·9	7·0	1560	South-East.
	Nucleus 1 .	16·2	13·8	6·0	1350	
2.		14·2	12·1	6·6	1140	Molopo-Groenwater.
		15·7	12·1	6·4	1225	Transvaal.
		14·7	11·8	7·4	1230	Natal.
		15·3	12·5	7·5	1395	South-East.
		15·3	12·3	7·5	1410	Southern Forests.
	Nucleus 2 .	15·0	12·1	7·1	1280	
3.		13·2	11·2	6·7	950	Orange Free State.
		13·4	11·7	6·4	910	South-East.
	Nucleus 3 .	13·3	11·5	6·5	930	
4.		12·0	9·9	5·4	640	Transvaal.
		11·8	9·5	6·0	675	Natal.
		11·5	10·2	6·9	810	Thirstland.
		11·5	9·1	6·3	710	Thirstland.
		11·2	10·0	5·8	640	Midlands.
		11·6	9·3	5·7	615	South-East.
		11·8	9·9	5·7	670	Southern Forests.
		12·3	9·2	5·1	585	Southern Forests.
	Nucleus 4 .	11·7	9·6	5·8	670	
5.		10·0	8·0	7·7	610	Transvaal.
		10·1	6·9	5·5	390	Thirstland.
		11·3	8·0	6·4	510	Southern Forests.
	Nucleus 5 .	10·5	7·6	6·3	505	
6.		8·5	6·9	5·8	340	Swaziland.
		8·9	6·9	5·5	350	Orange Free State.
		7·8	6·8	5·4	290	Orange Free State.
		8·5	6·9	6·3	380	Thirstland.
		8·2	6·9	4·3	240	South-East.
		9·0	7·4	4·4	310	Southern Forests.
	Nucleus 6 .	8·5	7·0	5·2	315	
7.		6·8	5·9	4·1	160	Transvaal.
		6·0	5·0	4·5	135	Orange Free State.
		6·7	5·5	3·9	145	South-East.
	Nucleus 7 .	6·5	5·5	4·2	150	

These nuclei are not true averages, as I have not loaded the figures correctly, but the error is not more than a few millimetres in each case. This table gives the distribution by areas, the nucleus figures, and the variation from the averages.

Unhappily it is impossible for us to say how many different objects it was intended to make. We might suggest that the makers were aiming at digging-stick stones, knobkerrie heads, and dagga-pipes; but they might just as easily have intended a variety of objects outside our ken, such as traps for small birds, stands for the centre-poles of huts, etc. Plotting the distribution of all individual types from the areas cited above, it will be found that there are three marked aggregations, coinciding with nuclei 2, 4, and 6. This suggests that three objects were intended, and leaves us with two possibilities: either nuclei 3, 5, and 7 are divergents, or we are considering two separate cultural spreads, each with three elements. Nuclei 1 and 2 are certainly related to each other in the Transvaal.

This coincidence of types over the greater part of the Union supplies us with proof that our groups are a valid and reasonable source for deductions as to migration and spread. Further proof can be obtained by the application of these types to geographical distribution with the intention of discovering localised types and migrational routes, reasonably related to terrain and environment. I have therefore plotted the distribution of those examples most closely approximating to the average in each area, with curious and unexpected results.

For the geographical plotting I employ a grid of one inch to the degree, using graph paper. This simplifies plotting, as one-tenth of an inch represents 6′ of degree, simplifying the making of distribution maps. The distortion resulting from the use of a square grid is negligible in the Union, and occurs at points where it is most needed, at the southern end of the Union where routes are congested.

In making deductions from distribution maps various points have to be constantly remembered, and we may list those that affect the present material.

1. Our knowledge depends to some extent on the original distribution of the prehistoric makers, and to some extent on the actual distribution of people sufficiently intelligent to recognise, collect, and submit specimens. Happily the two distributions roughly coincide, except in the sparsely populated Northern Transvaal and in the native territories.

2. Too little is known of the elongated series from the Transvaal, Natal, Bechuanaland, the Transkei and Basutoland to yield evidence

of value. Our deductions will be of the greatest value in the southern Free State, Griqualand West, and the Cape Province.

3. We can make three fairly safe deductions concerning the direction of migrations. South of 28° S. migration seems to have been radial, west, south-west or south-east from a point west of the Basutoland massifs, directed towards the coast-line. It is just possible that the elongated types (in contrast to the circular) may in some instances have passed through Natal to the South-Eastern area. Finally, once the coast was reached at any point migration might have been in either or in both possible directions.

4. Owing to the factor of "serial copying" we must expect to find a change in type average, or a doubling of types, as we go farther from the sourch of each type. This effect becomes marked when the Southern Forests are passed.

5. Areas immediately west of the Southern Forests seem to have been fed through that region, and the type averages at the Cape and the areas round about are somewhat different from those elsewhere.

6. The Southern Forests area thus seems to have been a point of sojourn and consolidation, a focus where types had time to multiply before passing farther west.

7. In studying migrational routes it may be possible from our knowledge of terrain to suggest the route followed along a particular stream, or through a gap in the hills.

8. Anomalous types (so marked on the list) have been tried out, but their distribution is of no value whatsoever. We must regard these as the products of individuality.

The Routes.*

Nucleus 1. 16·2 × 13·8 × 6·0 cm.

Confined to Messina in the northern Transvaal; then recurring at Happy Valley, Cathcart, and at Queenstown and Grahamstown. Two or three examples from the Cape show a similar type. The gaps of a thousand and six hundred miles respectively preclude any deductions.

Nucleus 2. 15·0 × 12·1 × 7·1 cm.

Examples from Messina, Roossenekal, Richmond, and "Natal" show a distribution towards Natal. A clearer route can be plotted as follows: Kuruman, Griquatown, Koffiefontein, Rosmead, Queenstown, Komgha, Kingwilliamstown, East London, Grahamstown, Alicedale.

* Maps of routes are given on pages 171 and 172.

Between Alicedale and Knysna there is a gap, and a slightly smaller type (13·9 × 11·2 × 6·5) runs to Cape Hangklip, Gordon's Bay, Simonstown, Cape Point, and to Malmesbury and Clanwilliam. It is highly probable that this southern variant is a derivative of nucleus 3.

Nucleus 3. 13·3 × 11·5 × 6·5 cm.

No examples are known north of 28° 20′ S. or east of 27° 30′ E. The distribution runs as follows: Windsorton, Koffiefontein, Mafeteng, Queenstown, Fort Beaufort, Grahamstown, Mimosa, Coega, Assegaibos, Tzitzikamma, Mossel Bay, Riversdale, Barrydale, Swellendam, Agulhas, Hermanus, Hawston, Caledon Coast, Hangklip, Gordon's Bay, Vlottenberg, Stellenbosch, and the Cape Peninsula. From about Stellenbosch there is a branch that continues to Wellington, Bain's Kloof, Goudini, Saldanha Bay. Towards the Cape the type changes to a slightly smaller average (12·6 × 10·9 × 5·8 cm.).

Nucleus 4. 11·7 × 9·6 × 5·8 cm.

This seems to be the most widespread and persistent type. We can really learn something from this distribution. There are some marked variants, but only those obviously related to local averages are employed here. Isolated examples from Natal suggest a distribution there, but the main spread is complicated and interesting.

- Ohrigstad.
  - Lichtenburg.
    - Taungs.
      - Britstown. Carnarvon. Bushmanland. Steinkopf.
      - Venterstad.
        - Steynsburg.
          - Graaff Reinet. Aberdeen. Knysna. Mossel Bay. Albertinia. Bloembos. Swellendam. C. Infanta. Hermanus. Gordon's Bay. Wellington. Clanwilliam.
          - Lady Frere.
            - Alicedale. P. Elizabeth. Sundays R. Humansdorp.
            - Stutterheim. East London.
  - Heilbron. Weenen. Kranskop.

In addition there is a local distribution in the Steenbras-Palmiet area and the Cape Peninsula, where the average changes to 11·4 × 9·5 × 5·0 cm., related to Hermanus and Gordon's Bay.

Nucleus 5. 10·5 × 7·6 × 6·3 cm.

This is not of great value, but shows an additional route to Namaqualand. It runs from Lydenburg, Sheppard Island, Britstown

to Steinkopf. A separate route (possibly linking with Britstown by way of Graaff-Reinet and Aberdeen) runs from Knysna to Kogel Bay, Gordon's Bay to Fish Hoek. Compare the Umhloti Beach example from Natal.

Nucleus 6. $8{\cdot}5 \times 7{\cdot}0 \times 5{\cdot}2$ cm.

The type occurs at Mbabane, then at Jakobsdal, Koffiefontein, Philippolis, Prieska, and Steinkopf, suggesting another route to Namaqualand.

The coastal route is so far separate from this, and runs from East London, through Coega, Jeffrey's Bay, Tzitzikamma, Robberg, Mossel Bay, Riversdale, Bloembos, Swellendam, Cape Infanta, Kogel Bay, Gordon's Bay, Hout Bay, Oranjezicht (Cape Town), and Fish Hoek, with a branch to Clanwilliam. The presence of an example at Sutherland suggests that in this instance there may have been a route crossing from Prieska to the Cape through the Thirstland, thus reversing all or part of the coastal route given here. For a time the average approximates to $9{\cdot}2 \times 7{\cdot}1 \times 5{\cdot}0$ cm., with little variation.

Nucleus 7. $6{\cdot}5 \times 5{\cdot}5 \times 4{\cdot}2$ cm.

Excluding the discs from Gordon's Bay, Swellendam, and Wellington, we can deal with these as two slightly different groups. The larger series, conforming to the figures given above, occurs at Lydenburg, Rietpan, Koffiefontein, Douglas, then at Komgha and East London, and finally at Wellington and Saldanha Bay. Slightly smaller examples ($6{\cdot}1 \times 5{\cdot}0 \times 3{\cdot}0$ cm.) occur at Koffiefontein and Victoria West, once again suggesting the possibility of a Thirstland route. Further knowledge of the western province of the Cape would help our knowledge very considerably.

Deductions.

In making deductions from our figures I intend to use the "Age and Area" hypothesis. This approach was first developed as a botanical tool, but has been applied to ethnology by Wissler in America, and by others. The fundamental premises, which I have augmented, may be expressed thus:

i. The area showing the greatest number of basic varieties of comparable objects was most probably the original centre of dispersal.
ii. The wider the spread of a recognisable type, the older the move-

ment is likely to have been. Conversely, the more confined the distribution, the younger the spread.

iii. The farther we go from the original centre of dispersal, the greater the divergence will be.

iv. The slower a spread, the greater will be the divergence and creation of new types; the smaller the variation in types over a given distance, the swifter will the spread have been.

v. A limited number of types will pass through a filter or barrier, to continue as derived variants on the far side. New and later varieties past the barrier will be unrelated to variants on the proximal side.

The first and third would appear contradictory, but the third is generally governed by the fifth hypothesis.

Though our knowledge of the bulk of Africa is scanty, we may accept the assumption that the original source of both circular and elongated types lay to the north of the Limpopo River, outside our field. There the incidence of these two general forms is much the same, circular and elongated forms appearing in approximately equal numbers. This area falls outside the scope of the present paper, and little need be hazarded on the relative age there of the two types discussed.

Once the Union was reached, seven "circular" prototypes survived the Limpopo barrier or filter, while only five "elongated" nuclei appear in the Transvaal, eventually increasing to seven. The number of circular examples in the Transvaal is vastly greater than the number of elongated. We therefore deduce that the makers of circular types persisted longer in the Transvaal than did the users of elongated forms.

The same must be said in the southern Free State and the Vaal basin. This is the area of greatest divergence of circular types. We also have the accumulated evidence of Prof. C. van Riet Lowe to prove that it is extraordinarily rich in material, especially Smithfield B sites associable with the circular series. We must therefore accept this as an area where a period of long sojourn provided variations and new types, a secondary centre of distribution for the circular forms. The same cannot be said of elongated types, which passed through the Free State relatively swiftly, leaving behind few examples and only four types.

Excluding the Western Bypass and Natal, both dependent upon the Transvaal or the Vaal for their origins, only a few circular types passed the Thirstland filter or barrier by routes we have already dis-

cussed. The Orange River provided a route to the west, the Ongers and Seekoei Rivers gave a roadway towards the fertile south, while other routes led through the Thornveld to the south-east coast. Movement due east was always debarred by the Basutoland massifs, though elements seem to have filtered through to the northern Transkei. South of the Orange River the circular types multiplied once again, but it is of great importance to note that there was no such increase in elongated forms until the Southern Forests were reached.

All this leads us to presume that the elongated types were later than the circular, and that they spread more swiftly until the Knysna area was reached. Low density of distribution and limited variation, up to this latter point, all lead to these deductions.

We may attempt to apply these principles to the spread of individual elongated nuclei, though we have little reason to suppose that there were more than two cultural groups involved. However, for what such deductions may eventually prove to be worth in the light of future research, here are the probabilities.

Nucleus 4. Most widespread, probably the oldest.
6. Slightly less widespread.
2. Merely spread to the coast. The Cape Region variant may be an independent and convergent development.
5 and 7. Each is possibly the product of two or even three independent developments, each relatively late.
3. Less widespread.
1. Spread slight, probably a restricted variant of type 2.

Such evidence is deductive and circumstantial, and before we may hope to presume on such a suggested order of movement very considerable work will have to be done on the stratigraphy of the bored stone, and its association with other cultural material, such as paintings, petroglyphs, pottery and the like. It is, however, interesting to note that the probabilities outlined above once again group the second, fourth, and sixth nuclei together, and the third, fifth, and seventh.

It will have been observed that there is a general similarity between the routes taken by the elongated types and some of the routes taken by the circular. There are two possible explanations; that these two main forms are coupled in certain instances, and therefore took the same paths; but the alternative seems preferable, that the elongated series was the later, and followed tracks already beaten by the earlier folk. This alone would explain the lack of concentration of elongated

forms in the Transvaal and Free State. But the possibility of linkage cannot be overlooked.

So far I have been unable to find any instance in which elongated and circular types occur together in undisturbed strata, showing either absolute association or dissociation. At Oakhurst where two types occurred in different early Wilton graves, both were circular.* At Keurfontein, Vosburg (where association only occurred in a spring), two vastly different circular examples occur together with Smithfield B implements, and so on.

Along the southern coast it has been my general conclusion from observation that elongated types occur on midden sites with pottery—that is, with late midden material; while circular examples belong to older non-pottery-bearing middens. This needs directed research, our main difficulty being that round forms tend to roll down middens and sandhills, while shifting dunes re-associate materials in incongruous patterns.

Careful excavation in untouched cave-midden sites is our only real hope. *Exact distribution* (in depth) of pottery and other elements, and the *exact relationship* of whole or broken examples of both general types of bored stone, should be watched far more carefully than heretofore.† J. F. Schofield's attribution of coastal pottery to the "Hottentots" may eventually yield proof that the elongated types belong to that complex, whatever we may call it. At Oakhurst the pottery belonged to a final stage of developed Wilton, long post-dating the circular bored stones there. No elongated bored stones occurred.

Summary of Main Conclusions.

1. As a whole the elongated forms show signs of being later than the circular types.

2. There is reason to assume that the elongated forms entered the Union somewhere in the region of Messina, across the Limpopo River at 30° East. long., either together or as two groups (2, 4 and 6, and 3, 5 and 7—type 1 being a probable derivative of 2).

3. The bearers of the circular types had a Smithfield culture, while they were held back in the southern Free State. The users of the elongated forms passed directly to the coast, and reached it at fewer points than the earlier people.

* Goodwin, Drennan and Schofield, "Oakhurst Shelter," Trans. Roy. Soc. S. Afr., vol. xxv, pp. 251 and 254 (Plates Vc and VI*a* show graves VI*a* and IX and IX*a* respectively, with bored stones *in situ*), 1937.

† *Idem*, p. 300.

4. Little variety occurs in elongated forms until the Southern Forests area is reached. Movement from the point of entry into the Union must therefore have been swift as far as Knysna, where the first period of consolidation took place.

5. Present deductions concerning the order of spread of elongated types are highly speculative.

6. Future work must differentiate clearly between circular and elongated types, and the association between each of these and other cultural elements will accumulate to provide the clue to the true position of each. Associations with petroglyphs and with paintings based upon large numbers of accumulated instances are no less important.

7. The possibility of certain elongated types being linked with certain circular forms must not be overlooked.

8. There is as yet no reason to suppose that the elongated series were carried by routes different from those used by the bearers of circular forms. The main differences lie in the paucity of routes used by those former, their more restricted spread, and the greater speed of distribution with the concomitant poverty of variants.

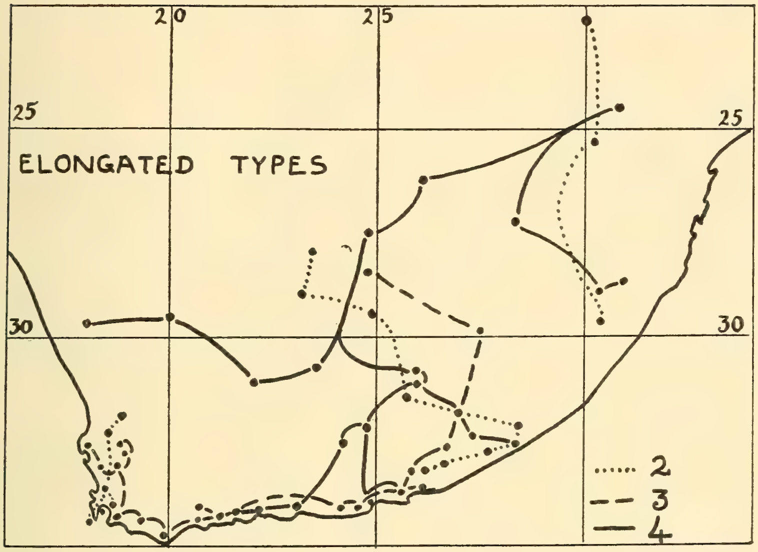
9. There has so far been no case of absolute association of an elongated type with specific implement types or with pottery, but both pottery and elongated forms are consistently found together on the surface of recent deposits along the south coast. This suggests a "Hottentot" culture.

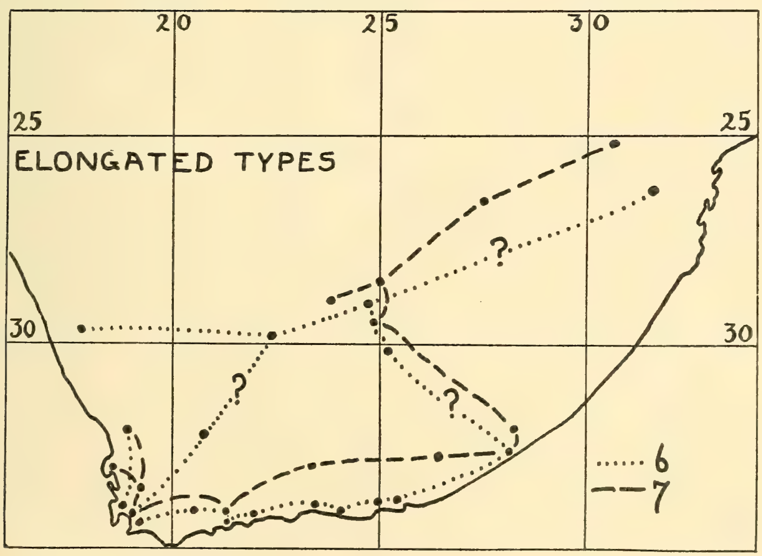
PART V.—THE BANTU SERIES.

Having discussed the prehistoric material, we may now turn our attention to the group of bored stones, confined to the Transvaal and immediately surrounding areas, that can with certainty be attributed to the Bantu of the early historical period. These may be dated as belonging to the first years of the last century and earlier.

In the main these people seem to have belonged to the Sotho group of tribes, to-day covering Bechuanaland, Basutoland, and parts of the Transvaal and Orange Free State. Their use of these stones seems originally to have been confined to the eastern Transvaal, and to have spread from there to the sources of the Molopo and Kuruman Rivers, and down the Wilge towards the Natal border.

These Bantu were simple farmers, the women practising horticulture, the men tending cattle or devoting themselves to the arts of





MAPS 13 AND 14.—Migrational Routes of elongated types.

MAP 15.—Distribution of elongated examples. Dotted li ... ibution of known circular types.

war. They seem to show no real alliance with the prehistoric users of bored stones, but one puzzling fact associates the Bantu and "Hottentots" of the Transvaal. This is the attribution at Mapungubwe * of a series of skulls to "a Bush-Boskop people, showing sporadically a few Negro features," associated with a cultural complex that is essentially Bantu and includes the use of terracing. Unhappily there is as yet no link between that offshoot of Zimbabwe culture and the bored stone.

The Sotho and allied tribes are sedentary, and live in villages near their fields for the agricultural part of the year. In the Transvaal these villages do not appear to have been large, and it is only when the eastern side of the Kalahari is reached that a true town economy, related to the immediate abundance of water, is practised. During the remainder of the year these tribes are generally transhumant, spreading far afield to pasture lands where they live in smaller units. So far as other customs are concerned, they form exogamous groups practising polygamy with patrilocal marriage. Their way of life is easily adapted to accommodate simple domestic slavery with concubinage, and indeed such habits are only now disappearing in the farther parts of Bechuanaland. The condition of these people 150 years ago was not very different, save that at that time they consistently practised terraced agriculture in the eastern Transvaal, and in that mountainous area the bored stone is associable with this peculiarly Mediterranean form of cultivation. Whether the association between bored stones and terraced fields is to be found in Southern Rhodesia at all consistently I do not know.

Filtering slowly down the subcontinent from the general region of the Great Lakes and the Rift Valley, the southern advance guard of the eastern branch of the Bantu-speaking peoples crossed the great divide of the Zambesi valley. Their cattle differed from those used by the earlier Hottentot migrations, but were quite as vulnerable to nagana. Hemmed in by the dangerous tsetse-fly country, to-day Portuguese East Africa, they were forced inland along the northern bank of the Zambesi, and must have crossed at a point free of fly, and west of the Victoria Falls.

Judging from cultural evidence, two great groups entered the Union by the same general highway, the Nguni and the Sotho. They show marked differences in pottery, hut-form, social and territorial organisation, and in language, but the fundamental similarities

* Fouché, Mapungubwe (Cambridge, 1937).

between the two groups are great.* Both had the same mode of life, similar concepts of chieftainship, grew the same crops † and herded the same stock.

The Nguni spread eastward, turning south when they reached the escarpment leading down to the tsetse stricken lowlands of the subequatorial east coast. They passed southward, east of the Basutoland massifs, to the healthy south-east coast, colonising Zululand, Natal, and the Transkei, and coming into marked contact with the Hottentot tribes along the Kei River and farther south. The Sotho people spread down the central plateau to populate the bulk of the country west of the Basutoland mountains, and continued as far south as the Orange River. Their main contact with the Hottentots seems to have occurred here, in the Douglas-Kuruman area, and not before.

The Bantu seem in all cases to have been the newcomers, the northward element, pressing down upon the earlier inhabitants. In the course of their movements southward they encountered the indigenous "Bushman" and "Hottentot" peoples, and these contacts showed themselves in various ways. The Bushmen were then a thriving people, simple hunters and collectors, living in rude shelters or under the overhang of rocky outcrops, and painting on their cave walls. They were by no means confined to the arid parts of the country. They depicted the Sotho tribes and their cattle, characterising them by their darker skins, their national shields and skin-cloaks, often wearing skin head-dresses with the tail still attached. The Ambo and Herero tribes of South West Africa (unrelated to either Nguni or Sotho, but representing a separate Bantu stock) learnt the art of making ostrich eggshell beads, and the trick of weaving or netting these into bracelets, necklets and headbands. The Nguni similarly took over the technique, but seem only to have applied it to the small trade beads of the east coast. They took over three basic clicks, with their nasalised, aspirated, voiced and unvoiced forms from their contacts with the Hottentots, presumably along the Great Kei River, where the two distinct ethnic groups lived beside each other for some time.

* See I. Schapera and A. J. H. Goodwin, "Work and Wealth," both in Schapera's Bantu-speaking Tribes of South Africa. Routledge, 1937. Also I. Schapera in his Western Civilization and the Natives of South Africa, "The Old Bantu Culture." Routledge, 1934.

† A. J. H. Goodwin, "The origins of certain African food plants," S.A.J.S., xxxvii, 1939.

In contrast the Sotho tribes seem to have been in closer touch with the Bushmen. They took over only one click, but adapted the Bushman mural parietal arts, and translated their own customary pottery and basketry designs into wall-paintings on their cylindrical hut walls, using the traditional Bushman earth colours. They appear to have been less antagonistic to the Bushman than other South African peoples, for it is important to note that the Bushmen survived longer in the Sotho territories than they did elsewhere. At Lake Chrissie, in the Tati area, in the Kalahari and in Basutoland the Bushmen were permitted to live and survive into the historic period, though generally as serfs.

These borrowed elements are not found among the Bantu north of the Limpopo until the Ndebele, Ngoni and Kololo movements, which shows that they originated in the Union before the end of the eighteenth century. There is therefore little reason for surprise that the bored stone and the techniques accompanying it were similarly adopted in certain areas of the country. The Sotho tribes have habitually incorporated Bushman or Hottentot girls into their economy, and these girls would readily have reverted to their own types of digging-stick, at periods when iron was scarce or unobtainable owing to the need for the munitions of war.

Where the introduction of the bored stone first took place, and how widespread the casual use of the stone-boring technique among the Bantu may have been we shall never know, but the region in which the Bantu definitely adopted the bored stone as an agricultural implement is definable. Broadly, the area seems to have been confined to the highlands north of the wide upper Limpopo Valley, to the highlands between the upper Limpopo and the upper Vaal valleys and to the Wilge tributary. The distribution commences at 31° 30′ E., and specimens are most numerous near the eastern limit, where they are consistently associable with terraced agriculture. The distribution thins out considerably towards the west, until only a few scattered examples appear in the central Transvaal, and fewer still in the western part of Bechuanaland. Applying the "Age and Area" hypothesis, we can deduce that the eastern Transvaal (judging from the variety of original forms) was the home of this instance of Bantu borrowing, and that subsequent spread within the Union was west or south from there.

The Transvaal and surrounding areas are thus the common field of two distinct cultural distributions. The general prehistoric types include the Transvaal, which also provides the distributional centre

for the Bantu types. Our first difficulty is therefore to differentiate between Bantu and prehistoric types. Complete differentiation is impossible, but we can allocate forms with a low percentage error. I use the word "forms" advisedly; as has already been shown (p. 10), certain examples in the Vet-Marico Rivers area were almost certainly conically bored with a metal borer. It will be shown later that there is reason to believe that many of the Transvaal prehistoric types were so bored, and that Hottentots, Bantu, and Bushmen were all using the digging-stick contemporaneously.

This could only mean that the users of the prehistoric types carried on their traditions of size and form, in some sort of association with the Bantu metal-users. The users of our prehistoric types were "Bushman" women, and we can only suppose that these girls were incorporated into the agricultural system of the Sotho peoples, and had access to metals for boring their stones. This point will be brought out more clearly when we discuss the histograms of the bore.

Differentiation of Types.

We have various criteria at our disposal for differentiating between Bantu and prehistoric types. Perhaps the most striking is the development of histograms and graphs, representing the various dimensions of specimens found within the Union. The second is the attribution of stones and groups of specimens to Bantu users, either by the Bantu themselves, or from their association with known Bantu settlements and terraced fields. In this latter group are sometimes found specimens that might fall within the Prehistoric Series. This is less important in the light of what has been said above about Sotho-Bushman concubinage. In most cases therefore, where specimens fit clearly into the prehistoric types they have been included there, even if found in apparent association with Bantu sites.

A further check is provided by geographical distribution. By comparing the Transvaal series with material from the remainder of the Union it becomes clear that a new cultural element is involved and can be isolated by statistical methods. In addition, as would be expected where two populations have inhabited the same area consecutively with a period of overlap, the implements of the earlier people show in several instances that they belong to older deposits, while Bantu types are more exclusively (though by no means completely) confined to surface or near-surface deposits, and are associated

with still recognisable terraced fields and settlements. This latter source of evidence is only worthy of consideration in dealing with fair numbers, as the dry soil and heavy summer rainfall of the Transvaal area lead to erosion, that in turn produces peculiar reversals of stratification, especially where cylindrical or subspherical objects are concerned.

A graphical plotting of the two circular groups, Bantu and prehistoric, reveals statistical differences. It will be found that the prehistoric types of most of the Transvaal conform to the seven prototypes given in Part III above (p. 162), while the Bantu series shows an almost completely haphazard distribution. This shows that once the bored stone had been completely assimilated into Bantu culture, the concept of "types" was dropped. There will therefore be no attempt to divide those examples into groups by form or size, but similarities between specimens will be noted, for what they may be worth.

I attribute this breakdown of the original types, so carefully maintained by the prehistoric folk, to the distributive effects of two Transvaal Bantu customs, exogamy and transhumance, both of which meant movement on the part of the women, users of the bored stones, away from their homes where they had learnt their agricultural methods. These two customs may even have acted together, so that women who married from cattle-posts might have moved even farther afield than would normally be expected. The refugee movements engendered by the Zulu explosion in the early years of last century played their part, and this will be further dealt with in discussing the MaNtatisi (Tlokwa) movement.

Sources.

Initial numbers refer to sites on the key map. As circular specimens are listed first, gaps will be found. These are left to include elongated examples, given later. Too much attention must not be paid to identical measurements in this Transvaal series. Examples from the Transvaal Museum, Pretoria, appear to have been measured to the nearest eighth of an inch (3 mm.), and the figures transcribed to millimetres. The apparent identity thus represents an error of 1·5 mm. in that series.

2. "Zimbabwe specimen" (South African Museum collection).

This unusual specimen was certainly made for ornament and not for use. It has been illustrated both by Bent and by Hall.* The

* Bent, Ruined Cities of Mashonaland (p. 170 in first edition, p. 202 in 1893 edition); and Hall, Prehistoric Rhodesia (1909, p. 350).

perimeter and one face are decorated with regularly disposed raised circular bosses, superficially resembling beaten metal work. Each boss is about 1·5 cm. in diameter and 3 to 4 mm. high, each carefully shaped. In contrast the underface is crude and irregular. The central bore has been chiselled to shape and shows no signs of usage. The hole in the upper face is well made (diam. 5·3 cm.), but the opposing mouth is larger and cruder (diam. 6·9 cm.).

Including bosses, the diameter is 21·6 cm., excluding bosses 21·0 cm. Including bosses, the height is 9·8 cm., excluding bosses 9·4 cm. The last measurement was taken on the central rim surrounding the hole.

The original gives the odd impression that it might have been a template or forme for the making of beaten gold objects. Had it been so used, it would have been impossible to remove it from the finished object without first breaking it. Two radial cuts, one deep and wide, the other shallower and narrower, set roughly at right angles to each other, mar the decorated face. They were made after completion and were present in Bent's illustration. No reason for their presence has been deduced. The material is a soft soapstone, easily carved or scratched, but too soft for hard use.

It is important to realise that this specimen was found by A. and W. Posselt, in 1889, in the "Zimbabwe Region," and was not found in the Zimbabwe "Temple" ruin. Hall stated that it was "found in close association with the great conical tower and platform, and with carved birds and scores of phalli." It was not. At the same time it must not be forgotten that the carving of the soapstone fits in well enough with the soapstone birds, etc., to be regarded as a part of the same general complex, as does the material. Additional remarks may be found in Miss Caton-Thompson.*

NORTHERN TRANSVAAL.

7. MARA.						
ASJ 43/49 .	19·7	12·0	60·9	4655	5·6	2·4
8. SAND RIVER, ZOUTPANSBERG.						
TMP 7392 .	18·4	13·0	70·6	4400	7·3	2·5
9. SCHOEMANSDAL, LOUISTRICHARDT.						
ASJ 51/38 .	19·5	11·2	57·4	4260	5·7	2·0

* Zimbabwe Culture (pp. 159 *et seq.*, footnote). Mr. J. Schofield of Durban tells me that the specimen was found on the surface of the Acropolis ruin, in plain association with the stone birds, by W. Posselt.

10. Spelonken.

SAM 3189	17·0	10·0	58·8	2890	5·0	2·4	

11. Duiwelskloof, Tzaneen.

TMP. 9122 .	19·0	11·0	57·9	3970	4·4	2·5	

North Central Transvaal.

13. Pietpotgietersrust.

TMP 7436 .	17·8	10·3	57·9	3265	3·3	2·2	Groenfontein 195.
7561 .	15·2	9·4	..	..	4·6	3·8	Bored, split, re-bored at right angles.

15. Kalkfontein 146.

SAM 3819 .	19·4	10·8	55·6	4065	6·8	1·7	6 feet deep in alluvial soil.
3817 .	19·5	10·6	54·3	4030	7·0	2·3	
3818 .	18·0	11·0	61·1	3565	4·0	2·3	
3817 .	20·4	7·4	36·3	3080	4·3	3·3	
	17·8	9·5	53·4	3010	4·2	2·6	
	15·8	7·8	49·3	1945	5·2	2·3	

16. New Smitsdorp.

TMP 1890 .	21·6	10·2	47·2	4760	3·6	1·3	
1887 .	25·4	7·0	27·6	4515	3·9	2·7	
1885 .	19·7	8·2	41·6	3180	4·2	3·0	Badly fashioned.
1888 .	16·5	10·8	65·4	2940	3·5	1·7	
1889 .	15·9	8·9	55·9	2250	2·9	1·3	
1886 .	15·2	7·3	47·8	2055	3·8	2·5	
1884 .	16·8	6·4	38·1	1805	1·9	1·4	Uneven, badly fashioned.
5895 .	15·2	7·3	47·9	1690	3·6	1·7	Irregular.
2337 .	15·2	7·0	46·0	1615	3·5	1·9	
1883 .	19·0	4·3	22·6	1550	3·4	2·5	
5894 .	13·3	4·3	32·6	760	3·8	2·7	

17. Eersteling.

TMP 9176 .	15·2	7·5	49·2	1735	3·3	2·4	Surface find.

Eastern Transvaal.

18. Ohrigstad.

MMK 1255 .	19·1	10·3	53·9	3755	4·4	2·0	
PEM 615 J .	17·2	10·7	62·0	3165	4·3	1·8	4·9 kg.

19. Rustplaats.

TMP 7880 .	16·5	6·2	37·6	1690	8·7	7·7	"Dug from deep underground."

20. Krugerspost.

TMP 9123 .	19·0	14·7	77·4	5305	5·9	2·5	Huge. Surface find.
8039 .	16·2	12·4	76·4	3255	6·0	2·9	

21. Waterfall Valley.

TMP 2339 .	19·0	11·4	60·0	4115	5·0	3·0	"Makatese." Fine workmanship.

22. BARKLY VALE. ALKMAAR.							
HAC 1041 .	15·8	8·5	53·2	2120	5·0	2·8	Diabase. Surface of old river terrace. Weathered. 3·6 kg.
23. SCHAGEN, NELSPRUIT.							
WUA 1086 .	19·9	14·6	73·4	5780	3·6	..	9·7 kg. ?Gabbro.
1085 F .	18·0	12·3	68·3	3985	4·5	3·8	6·2 kg. Talcschist.
1085 E .	18·2	11·7	64·3	3875	6·3	2·9	6·3 kg. Amphibolite.
1085 B .	16·8	13·1	78·4	3695	5·5	2·4	5·5 kg. ?Gabbro.
1085 A .	17·7	9·5	53·7	2975	3·8	1·8	4·1 kg. ?Gabbro.
1085 C .	13·9	8·4	60·4	1625	4·3	2·8	2·2 kg. Talc serpentine.
1085 H .	14·8	3·4	23·0	745	4·1	2·4	Broken. Talc schist.
24. BARBERTON.							
ASJ 49/36/8 .	18·6	14·0	75·2	4845	4·0	2·6	
TMP 1914 .	20·3	9·8	48·2	4040	3·3	1·7	Lot 133. Surface.
1911 .	16·5	10·6	64·2	2885	4·9	2·7	Lot 133. Native smelting work.
1912 .	16·5	5·9	57·6	2585	5·2	2·4	Kaap River wash, near Honeybird Creek, with a prehistoric specimen.
SAM 3017 .	15·0	11·0	73·3	2475	7·0	2·9	Surface. Hole has distinct shoulder near mouth. Fine workmanship.
26. WELGEVONDEN, KOMATI VALLEY.							
TMP 8031 .	24·1	8·5	35·3	4935	8·1	3·4	
8027 .	19·0	10·6	55·8	3825	5·6	3·0	
8024 .	20·0	9·5	47·5	3800	5·3	2·5	
8026 .	18·7	10·8	57·9	3775	5·6	2·0	Irregular.
8022 .	17·8	11·4	64·0	3610	6·0	3·5	
8021 .	18·7	10·3	55·1	3600	5·1	3·2	
8032 .	20·3	8·1	40·0	3340	6·4	3·0	
8030 .	20·3	7·9	38·9	3255	4·4	2·9	
8019 .	17·4	10·2	58·6	3090	4·9	2·8	
8020 .	19·7	(8·2)	..	..	6·3	2·7	These last three specimens seem to have been cut (?) horizontally.
8025 .	20·0	(7·5)	..	..	5·3	3·4	
8023 .	19·0	(5·4)	..	..	5·2	2·4	

STEENKAMPSBERG.

27. ROOSSENEKAL.							
MMK 1155 .	16·5	9·7	59·1	2460	4·2	2·9	
28. BADFONTEIN.							
TMP 2344 .	20·3	12·7	62·5	5235	3·0	2·3	
2338 .	18·4	11·7	63·5	3960	4·8	3·0	"Makatese." Fine workmanship.
2347 .	17·8	10·6	59·9	3360	4·5	2·9	
2345 .	17·8	10·0	56·2	3170	5·6	1·7	
2346 .	17·8	9·4	52·8	2980	3·5	2·5	

29. Schoemanskloof.							
TMP 2341 .	17·8	13·0	73·0	4120	4·9	2·2	"Makatese." Surface. Possibly unfinished.
2340 .	16·5	12·4	75·7	3375	4·9	2·9	"Makatese." Surface find.
30. Machadadorp.							
ASJ 15/35/2 .	18·4	12·0	65·2	4065	6·3	2·4	Amphibolite.
31. Sevenfontein 39.							
ASJ 12/36 .	20·3	10·7	52·7	4410	5·0	2·3	Ss.
32. Waterval 97.							
ASJ 12/41 .	19·1	12·3	64·4	4485	4·7	1·6	Diabase.
	19·5	10·7	54·9	4070	7·5	3·5	Serpentine.
	19·5	9·6	49·9	3650	5·0	2·7	
	17·7	10·9	61·6	3420	5·3	2·2	
	17·2	11·2	65·1	3315	4·4	1·5	
	16·6	9·1	54·8	2510	5·0	2·7	
	19·2	6·5	33·8	2395	5·2	3·5	Hole bored skew.
33. Bloemfontein 101.							
ASJ 12/36/B .	18·7	12·0	64·2	4195	5·9	2·3	

(Both Waterval 97 and Bloemfontein 101 material is associated with Bantu terraced agriculture and ruins in the Komati valley. They are adjacent farms.)

34. Carolina.							
SAM 3020 .	17·0	10·8	63·5	3120	4·0	2·8	
	(7·2	6·3	87·5	325	3·2	2·7)	Unfinished dagga-pipe?
	(7·2	6·3	87·5	325	2·8	1·5)	Unfinished dagga-pipe? Sides flattened.

Sources of the Vaal.

35. Breyten.							
SI 20 . .	20·2	11·2	55·4	4570	4·2	2·6	Glen Avon Farm.
36. Ermelo.							
WUA 1036 .	18·6	9·1	48·9	3150	5·0	3·5	5·2 kg. ?Gabbro.
NMP. 2066 .	17·8	9·8	55·0	3105	5·2	2·7	3·9 kg.
37. Witkraans 58.							
TMP 2348 .	18·7	10·3	55·1	3600	5·1	2·4	Vaal River, south of Ermelo.
WUA 1036 .	18·6	9·1	48·9	3150	5·0	3·5	5·2 kg.
38. Mount Prospect, Amajuba.							
JE Briscoe .	17·8	13·5	75·8	4275	4·4	2·3	Surface deposit.
39. Heilbron.							
ELM 36 . .	20·5	11·5	56·1	4835	5·0	2·5	Rhenoster River affluent.
36/B .	18·5	11·0	59·5	3765	5·0	3·0	*Cf.* first Witkraans spec.

East Central Transvaal.

40. Mapochsgronden.							
TMP 2342 .	19·7	11·6	58·9	4500	5·9	2·7	
	19·0	8·9	41·6	3215	4·8	2·7	Broken.
41. Witpoort.							
TMP 7543 .	19·7	11·7	59·4	4540	5·7	2·7	
42. Lagersdrift.							
TMP 2775 .	17·1	9·5	55·6	2775	5·8	2·1	
43. Klipbankspruit.							
TMP 5893 .	17·8	9·8	55·0	3105	5·1	3·6	

Central Transvaal.

44. Nylstroom.							
SAM 3843	15·0	9·5	63·3	2140	3·1	1·2	
45 Turffontein.							
TMP 1892 .	14·0	13·3	95·0	2605	2·9	1·1	Found in Bantu kraal.
46. Warmbaths.							
MMK 1153 .	15·3	11·8	76·6	2760	4·8	1·5	Ss.
47. Wonderboom.							
TMP 1894 .	19·0	10·2	53·7	3680	4·3	1·9	Badly trimmed.

Southern Transvaal.

48. Selons Valley.							
TMP. 5908 .	20·3	7·6	37·4	3130	5·7	2·5	
49. Middelburg.							
ADJ 49/36/9 .	18·7	9·3	49·6	3250	6·0	2·5	
50. Devon.							
TMP 1417 .	16·2	11·7	72·9	3070	5·3	2·0	Suikerbosrand affluent.
1418 .	19·7	(4·5)	..	..	4·5	3·0	?Cut horizontally.
51. Greenlands.							
ASJ 8/41 .	15·2	11·1	72·2	2565	4·5	2·6	18 inches deep. No associations. *Cf.* first Devon specimen.

Elongated Specimens.

1. Gwaai Reserve, S. Rhodesia.						
SR/WI 3/653	17·5	15·4	8·9	2400	4·5	2·3

3. MELSETTER.							
SR/WI 3/654 .	18·4	15·4	(6·0)	1700	3·5	2·4	Soft red Ss. Riverhill farm. One face worn recently.
4. MESSINA.							
HA Coll. 1248 .	16·5	13·8	5·0	905	4·5	3·6	1·5 kg. Weathered schist.
1247 .	15·3	12·0	3·5	645	3·5	1·4	1·2 kg. Basic schist.
5. MALABOCH.							
ASJ 15/35/1 .	20·9	15·5	9·8	3050	6·1	1·8	Amphibolite. Eccentric bore.
6. BLAAUWBERG.							
ASJ . .	20·7	15·2	9·2	2895	5·4	2·1	
23. SCHAGEN, NELSPRUIT.							
WUA 1085 D .	18·3	14·4	9·0	2370	3·6	2·0	4·6 kg. ?Gabbro.
1087 .	18·5	13·3	(8·7)	2140	5·1	2·9	?Gabbro.
25. STEYNSDORP.							
TMP 1449 .	27·9	17·8	3·5	1740	5·4	1·8	
26. WELGEVONDEN.							
TMP 8029 .	22·9	15·5	8·7	3090	4·8	2·8	Irregular shape.
	15·2	12·7	5·3	1025	4·6	1·6	Irregular shape.
39. HEILBRON.							
ELM 36 A .	24·0	16·5	11·5	4555	4·5	3·0	6·2 kg.
49. MIDDELBURG.							
ASJ . .	20·0	16·3	7·0	2280	4·8	2·3	

VARIOUS.

52. RICKETSDAM, MARICO.							
WUA 397 .	7·5	6·7	5·7	285	3·2	2·5	0·62 kg. Ironstone. Found with ash-heaps, metal industry and pottery. (Elongated.)
14. PIETERSBURG.							
SAM 3821 .	13·7	12·0	3·4	..	3·7	1·9	Soapstone. Elongated.
,, . .	..	(14·0)	4·8	..	5·0	1·1	Soapstone. Subcircular.

Mr. T. J. Trevor, when submitting these last to Dr. Péringuey in 1917, wrote: "In other parts of the country where such stones are plentiful, I have been informed by the natives that they used to carry these on a stick, in order to have them handy to throw at a buck—

the idea being to throw them on edge like a skipping-stone and attempt to break the buck's leg." Both examples are formless slabs of soapstone, quite untooled. Their only right to inclusion lies in the central bore. But compare the example described by P. J. Kloppers * from Natal, referred to in a previous part of this present work (p. 33).

Two examples away from the Transvaal are almost certainly Bantu in origin, and probably quite modern. Both appear to have been bored with a fine metal drill, probably fencing wire, possibly Bantu-made wire, or the tang of a light spear. Only the actual dimensions are given. They are probably beads of some sort.

61. Newlands, Barkly West.							
MMK 1536 .	4·9	3·7	..	..	0·6	0·4	Broken.
62. Ramalitse, Thabanchu.							
SAM 4873 .	2·05	1·7	..	..	0·7	0·5	

We now come to a series of figures that appears to be related to the path taken by the BaTlokwa and other Bantu peoples, under the leadership of their queen, MaNtatisi. This extraordinary movement has got the name of "Makatisi," etc., in the Transvaal, where these people lived before the hopeless refugee movement that ended in their destruction and scattering in the neighbourhood of Litaku and Kuruman. I have started with the Ventersdorp and Wolmaransstad sites, as this material accords better here than with the remainder of the Transvaal.

54. Ventersdorp.							
TMP 3721 .	14·9	5·6	37·6	1245	3·9	2·5	Schoonspruit affluent.
ASJ 17/43 .	15·5	8·3	53·5	1955	6·3	(1·8)	Wonderstone. Conical bore. Stompjie's Diggings.
55. Wolmaransstad.							
TMP 8047 .	12·7	2·4	20·0	405	3·0	1·9	Makwassiespruit affluent.
56. Mafeking.							
ASJ 38/38 .	11·2	13·9	124·1	1745	4·9	2·1	Probably metal bored.
57. Vryburg.							
SAM 763 . .	14·0	14·2	101·5	2783	3·7	2·4	3 feet deep. Hassforth. Metal bored.
Mossop Coll. .	14·4	8·0	55·6	1659	5·2	2·6	Pecked. Farm England.

* S. Afr. J. Sci., xxxi, 1935, pp. 474–475, illust.

58. RIVERVIEW ESTATE, VAAL RIVER.							
ASJ 5/35/55 .	17·0	10·5	61·8	3035	6·0	..	Site VI. Sohnge, Visser and Lowe, *op. cit.*
59. POSTMASBURG.							
MMK 252 .	14·3	12·0	83·9	2455	5·3	3·2	Ss.
577 .	14·8	6·5	43·1	1425	4·3	2·2	Ss.
	14·3	4·8	33·6	980	2·4	1·8	Ss. Metal bored.
583 .	13·8	4·9	28·2	935	2·5	1·7	Ss. Metal bored.
191 .	14·3	..	..	..	..	2·0	Very worn soapstone.
60. KAMEELFONTEIN.							
MMK 1283 .	14·8	15·4	104·1	3375	(4·2)	2·5	Metal bored.

It will be noted that, in general, the average diameter (14·5 cm.) is a little below the minimum for the Transvaal Bantu types, and only one example, from Riverview, exceeds that minimum. Height is erratic, showing extremely thick examples (in three instances with an index in excess of 100·8 per cent.) and very flat types. None of these fit comfortably into the Prehistoric Series. The Wolmaransstad specimen recalls the Natal Lowlands.

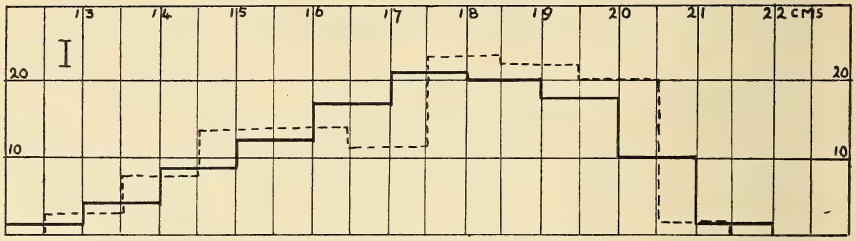
The first Vryburg specimen, from Hassforth, is somewhat amusing, as it has obviously been made to resemble an ostrich egg in shape, texture, and size. The material is marble.

The Tlokwa migration and eventual dispersal will be discussed more specifically later (p. 202).

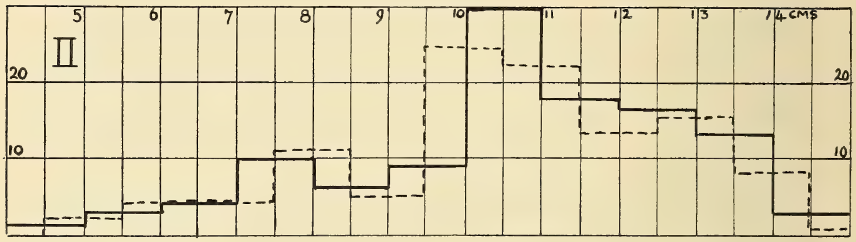
GENERAL DIMENSIONS.

If the diameters of all Transvaal specimens are considered, we find that an absolute differentiation is possible (Histograms I and II). All those specimens from the neighbourhood of the Transvaal with a diameter greater than 15·1 cm. are Bantu. All those examples from the same neighbourhood with a diameter less than 13·4 cm. are prehistoric. From perhaps 14·0 cm. to 15·0 cm. there are overlapping types, some Bantu, some prehistoric. These last are most consistently represented in the Vryburg-Postmasburg area, where we find several examples that fail to fit the prehistoric types, while some show distinct use of a metal borer. These I attribute to the Tlokwa migration.

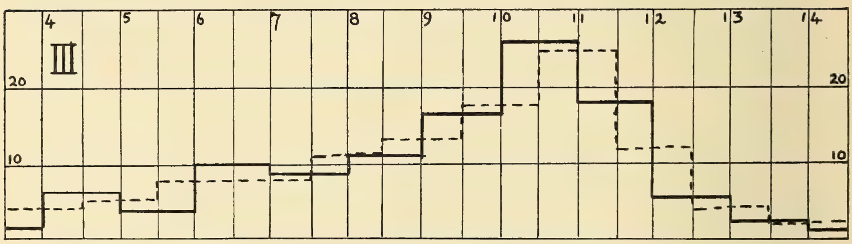
For purposes of direct comparison I have used the figures of all the Bantu specimens, and prehistoric material from the same area. It will be seen that the Bantu Series yields a simple but asymmetrical curve, with a peak between 17·5 and 19·5 cm. (mode 17·8 cm.). The range is from 12·3 to 21·5 cm., though there are three examples with a diameter greater than 20·5 cm. In contrast to this the Prehistoric



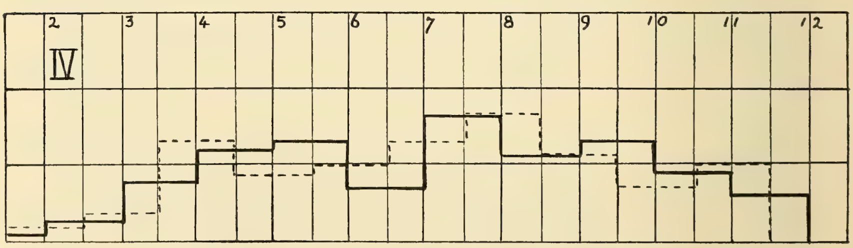
I. Bantu circular examples by diameter.



II. Prehistoric Transvaal circular examples by diameter.



III. Bantu circular and elongated examples by height.



IV. Prehistoric Transvaal circular examples by height.

Fig. 7.

Series produces a trimodal curve, with modal points at 8·0 cm., 10·4 cm., and 12·8 cm. respectively. These probably represent three uses of the bored stone, but mathematically they are made up of the seven prototypes and their variants already analysed. These examples cover an effective range of 4·5 to 14·5 cm.

The study of height alone (Histograms III and IV) provides little new evidence, but corroborates the study of diameters. The prehistoric Transvaal material yields an irregular curve, again showing a trimodal distribution, with modes at 4·3 cm., 7·7 cm., and 9·5 cm. This is obviously a product of the same causes outlined above. In contrast the Bantu Series shows a simple asymmetrical curve, with the mode at 10·7 cm. This asymmetry can be attributed to the desire to make an implement as close to the limits of thickness as could be efficiently bored. The effective ranges in the two histograms are about 2·0 to 12·0 cm. for the prehistoric, and 3·5 to 13·5 cm. for the Bantu, merely showing that, while the Bantu and prehistoric people were capable of boring through similar thickness of stone, the Bantu could extend their range slightly towards thicker stones.

I have not given histograms of index or cube, but these can be very easily worked out on graph paper from the data. The study of index shows that Bantu types have an effective range of 20 to 78 per cent., with a mode at 56 per cent. They seldom exceed 66 per cent., and only one or two examples reach 100 per cent. In contrast, the Prehistoric Series from the whole Union quite frequently exceeds 100 per cent. and even 110 per cent., to form prolate anomalies, with no distinctive distribution.

The study of cube is comparable to that given above for the diameters. The prehistoric range from 50 cu. cm. to 2000 cu. cm., and the Bantu from 2400 cu. cm. to 5300 cu. cm. The intervening depression covers a few isolated examples of ambiguous origin, but not too much faith should be placed in the "cube" as evidence.

This gives us sufficient data to define the great proportion of our Bantu examples. They consist of those from the neighbourhood of the Transvaal with a diameter greater than 15·1 cm., a cube greater than 2400 cu. cm., a weight greater than 3·7 kg. (8 lb. 3 oz.), and a height that does not usually exceed 78 per cent. of the diameter. While this does not cover all known Bantu examples, it excludes prehistoric types. To complete the Bantu Series we should include smaller forms from this general locality that do not conform to the known

prehistoric types. Their allocation becomes more certain when they fit comfortably as extensions of graphs or histograms based upon known Bantu material. This last applies especially to the Tlokwa migration.

Study of the Bore.

I have attempted to discover whether there is any means by which we can recognise examples that have been bored by metal tools. Almost cylindrical bores are rare, and are certainly products of usage, and not of technique. The Zimbabwe area specimen is an exception to this rule, just as it is to many others. Here tool marks visible in the hole through the soft soapstone show that this was partly chiselled to shape, and there are no signs of usage.

In such a study the centre of the hole can yield no result, as the bore may be unfinished or may have been smoothed and enlarged by use. In the biconical holes there should be some relationship between the base of the cone (represented by the mouth of the hole) and the thickness of the stone ; or, more accurately, half the thickness of the stone. I have therefore developed histograms of the Index of Bore:

$$IB = \frac{\text{mouth of hole} \times 100}{\text{height}}.$$

At best the results obtained from such an index can only be very general, as we are dealing with a variety of irregular cones cut into materials of varying hardness. In some cases the lip of the conical bore is difficult to recognise, in others the mouth of the bore varies on the two faces of the specimens. Measurements are taken from the wider mouth of the bore, so that this is to some extent accounted for. I have refrained from giving the IB of specimens in the lists of sources of data, as individual cases are merely misleading. However, provided that we do not argue from the general to the particular, we can draw some conclusions from the accumulated figures.

We must exclude examples with a conical bore. Discs or specimens less than 3·5 cm. thick have to be ignored as well. It was found that 18 such specimens from the Cape show an average IB of 116·5 per cent., while 22 from the Knysna area yield an average IB of 114·1 per cent. This suggests that boring in the case of smaller stones was done by pecking two wide cup-shaped depressions in the opposing faces of the stone, then merely using the rimer to smooth and enlarge the hole. This is a very slight technical variation, and may or may

not be cultural. Perhaps a more accurate gauge might be developed by plotting IB against height or thickness, on squared paper, but from the few samples I have so far tested there seems to be little new to be learnt from this.

Histograms of all Bantu and all Transvaal prehistoric examples are given (Histograms V and VI), and as a check I have developed the histogram (No. VII) of 106 examples from the Free State, chosen mainly from the Koffiefontein sites, but otherwise at random.

The 88 Transvaal Bantu specimens show an effective range of 20 to 85 per cent., an almost symmetrical curve with the mode at 45 per cent. The 86 prehistoric examples from the same general area yield an asymmetrical curve over a range from 25 to 100 per cent., with the mode at 43 per cent.—even lower than the mode of the Bantu Series. It becomes obvious that the two curves are directly comparable, and that specimens were bored by the same techniques. I had hoped to find a bimodal curve, representing those bored with metal (low index) and those bored with stone (high index), but instead we find that the bulk of specimens in each case show an IB greater than the mode (*i.e.* the average is higher than the mode, yielding an asymmetrical curve), suggesting that many specimens in both series were bored with stone, but that a high proportion of those below the mode were bored with metal. This fits perfectly with the deductions made earlier concerning the conical-bored specimens from the VMR. area in the western Transvaal.

This deduction must be viewed in the light of comparative material from elsewhere, and, knowing that the IB in the Free State shows a different state of affairs, I give the histogram of 106 examples from there. The range is from 30 to 105 per cent. The main mode is at 60 per cent., and there is a subsidiary mode at 77 per cent., due to the absence of figures from 73 to 75 per cent., possibly a chance gap, but possibly due to differences of material. The stones used in the Free State range from hard igneous rock or indurated shale to somewhat softer sandstones or shales.

In an attempt to control these figures by means of a third series, a sample was taken from the Tzitzikamma-Knysna-Mossel Bay area, where coarse-grained tertiary sandstones and fine-grained quartzitic sandstones are used. The sample (Histogram VIII) shows a range from 33 to 129 per cent., a fairly symmetrical curve with a mode at 63 per cent. A final sample from the Cape of Good Hope shows an exactly comparable symmetrical curve, from 41 to 120 per cent., with

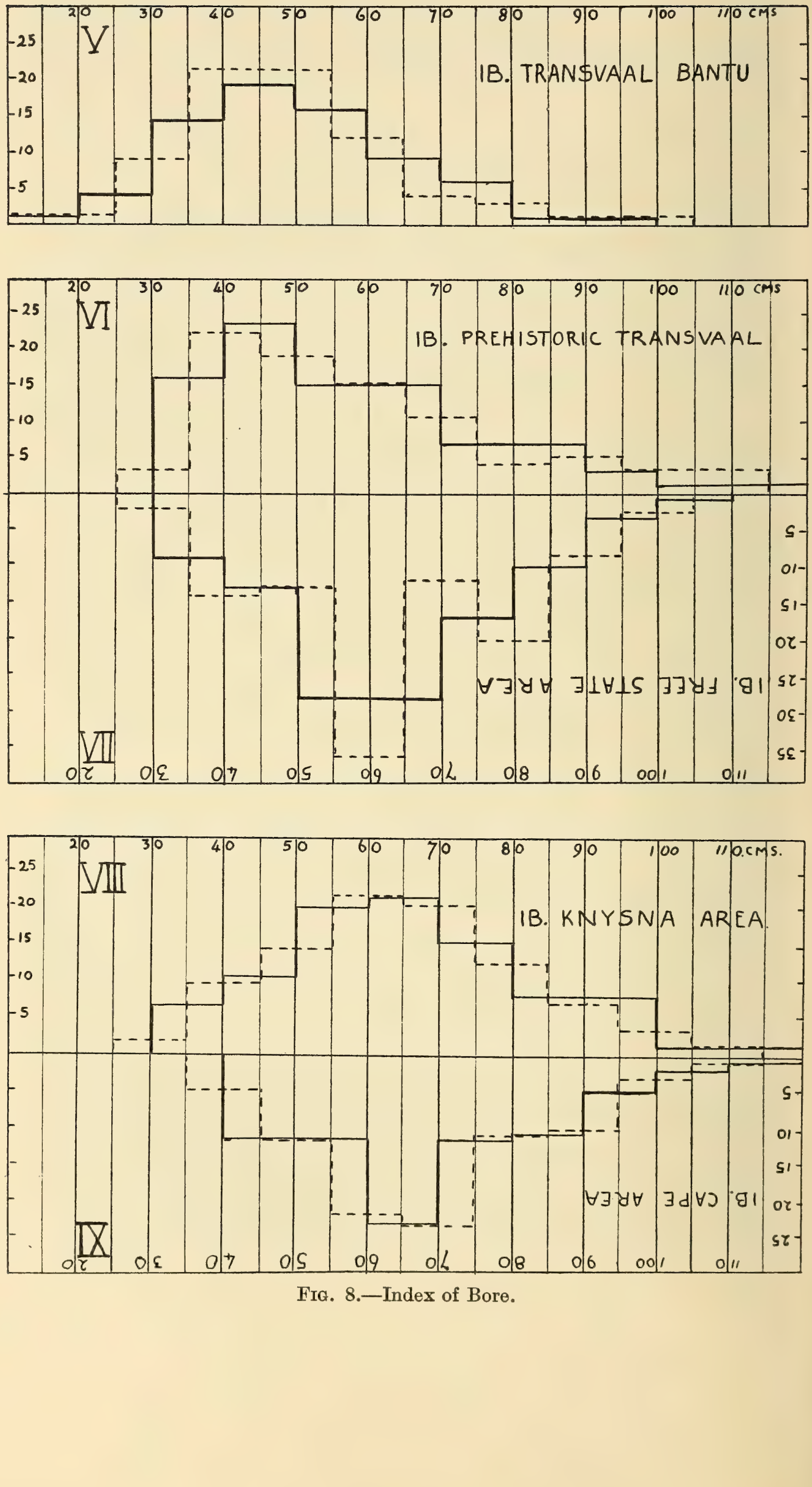


FIG. 8.—Index of Bore.

the mode at 66 per cent. The materials used here are quartzitic Table Mountain Sandstones, Malmesbury shales, etc.*

From the comparative evidence yielded by these histograms we can state with certainty that some distorting factor is present below the 50 per cent. line in both the Transvaal histograms that is absent elsewhere. It is reasonable to assume, in the light of the conical-bored specimens in the Prehistoric Series, that this factor was the use of metal. Developing this assumption, we may further assume that all examples with an IB below 30 per cent. (the lower limit of almost all IB from outside the Transvaal) have certainly been bored with iron.

At the same time it is essential to remember that many of the materials used in the Transvaal were of a softness and a coherent texture that would permit of a narrower bore than harder substances. The prevalence here of soapstones, schists, marble, wonderstone, soft shale, etc., cannot reasonably be ignored. Unluckily the exact knowledge we need is not available, and we can draw no conclusions with certainty. What is wanted is not an exact analysis of the stone, but rather some gauge, akin to the rule of thumb used by geologists to denote hardness and softness, to provide us with knowledge of reaction to mechanical corrasion. A gauge of this sort has recently been developed by M. J. Janmart in Angola in an attempt to assess relative wear in mixed gravels. It is to be hoped that some of his methods and results will be published.

In general we can take it that, in those areas and periods that show symmetrical curves in the histograms of IB, these represent the desire to bore a hole through the stone, without any interest in the size of the mouth of the hole. In cases where there is a marked asymmetry towards the lower indices, we must suppose that some real effort has been made to obtain as narrow a mouth as possible. The distortion in the curve represents the degree of effectiveness of this additional effort, by whatever means the narrower bore was accomplished.

Affinities.

In plotting these Bantu figures graphically I have found that the most illuminating presentation is obtained by using height as the

* Not included in this last sample are two striking and perhaps important specimens. One is from Hout Bay, with an IB of 18 per cent., the other from Stellenbosch with an IB of 30 per cent. Both are in the University of Cape Town Collection. The Hout Bay example is certainly metal-bored, and the Stellenbosch specimen lies on the 30 per cent. line, which we can safely regard as the line of absolute demarcation between the two methods of boring.

horizontal component, and index as the vertical. There is little that can be said with any certainty, and there seems little relationship between type and geographical distribution. Larger numbers of specimens and a greater and more exact knowledge of association, use, and provenance are essential before this question can be finally dissolved.

1. Specimens from Greenlands and Devon, both on the Suikerbosrand stream, show distinct affinities. Both belong to a small group with indices above 70 per cent. and heights between 11·0 and 12·0 cm., thus standing somewhat separate from the usual types.

2. Heilbron shows affinities with Breyten, Ermelo, and Witkraans, and perhaps with some of the Welgevonden and Waterval Series.

3. In the northern Transvaal the following sites show strong affinity, Mara, Louis Trichardt, Sand River, Spelonken, and Tzaneen (sites 7 to 11). All have diameters between 17·0 and 19·7 cm. and indices ranging from 57·9 to 70·6 per cent.

4. The farm England in the Vryburg district shows affinity with four specimens from New Smitsdorp (16), one from Kalkfontein (15), and the Eersteling specimen (17), suggesting that the Vryburg example is an offshoot from the northern Transvaal.

5. The Mount Prospect specimen (38) is very similar to the first example from Schoemanskloof (29). Mount Prospect lies in the original area of the BaTlokwa and BaSia tribes.

6. In the elongated series the two Rhodesian sites show marked affinities, and Malaboch (5) and Blaauwberg (6) show much the same type.

In general we can gather that no type of implement is localised to any one area, the makers seem at times to have aimed at divergent shapes and sizes. This can be seen by comparing the eastern Transvaal figures and those from the sources of the Vaal with material farther west.

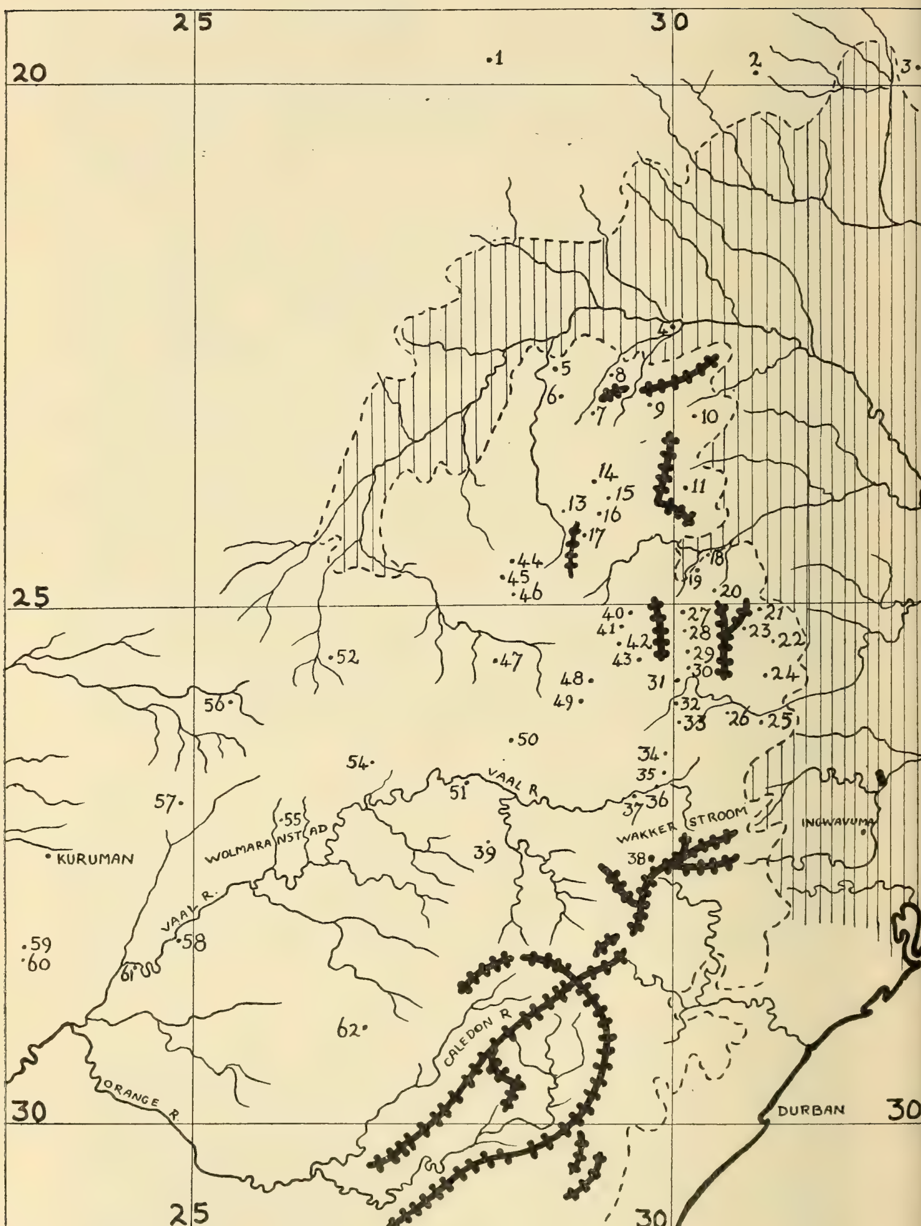
Distribution.

The distribution of known specimens is of extreme interest. Mr. T. J. Trevor, writing to Péringuey on 28th August 1917, notes that the Bantu specimens "are plentiful in all the districts of the Transvaal, with the exception of the Low Country below the Drakensberg on the east, where I only found one." Apart from that short reference, nobody seems to have realised the relationship existing between distribution and altitude. The distribution of all specimens known corresponds in a most remarkable manner with the highlands of

Southern Rhodesia and the Transvaal, and careful collation with the physiographic map shows that the makers of these stones seldom transgressed below the 2500- to 3000-foot contours (800 to 900 m.). The Letaba, Pilgrim's Rest, Nelspruit, Barberton, and Swaziland lowlands are without specimens, while the relatively low-lying Gwanda and Chibi districts in Southern Rhodesia are similarly barren of Bantu bored stones.

In contrast to this, specimens are scattered all along the adjacent highlands. In Rhodesia the three Bantu examples are from the Gwaai reserve, the Zimbabwe area, and Melsetter district. In the northern Transvaal one questionable group alone comes from Messina in the Limpopo valley. The remainder are concentrated along the Blaauwberg-Zoutpansberg ridges. South of this there is a gap coinciding with the Great Letaba valley. South and south-west of that river the distribution increases to its maximum concentration, along the Strydpoortberg and down the Drakensberg. Distribution continues down either side of the Steenkamsberg, and south to Witkraans, Heilbron, and Amajuba, a solitary outpost on the Natal border. Another extension runs westward through Nylstroom, Warmbaths, Middelburg, and Wonderboom, and a southward drive passes along the Suikerbosrand to Devon and Greenlands. The further extension west and south, related to the Vaal River, consists of sites at Ventersdorp, Wolmaransstad, Vryburg, Mafeking, and others marking the MaNtatisi spread.

This curious relationship between altitude and the Bantu bored stones can imply only one thing, namely, that we are dealing with a mixed pastoral and agricultural people, limited strictly by the original distribution of the tsetse-fly and cattle nagana. All the extreme eastern Transvaal and the lower and middle reaches of the great eastward-flowing rivers were fly-infested before the "Great Rinderpest" of 1892–1894 so reduced the cattle and big game that the fly was thinned out through lack of the essential hosts. The tsetse-borne nagana, while consistently fatal to cattle, appears to infect big game less fatally. Both fly and nagana appear to be maintained by game, so that these areas provide an almost complete cattle-barrier. This does not necessarily mean that this barrier was absolute so far as Bantu agriculturalists were concerned: a native can exist as a precarious tiller of the soil without cattle, and indeed the impoverishment of the native tribes of Portuguese East Africa is fundamentally due to this one-sided mode of life in a cruel environment. To enter the tsetse belt means poverty and struggle, so that the distribution,



MAP 16.—Distribution of Bantu Bored Stones. Areas with general Tsetse history shaded. 3000 ft. contour marked. Sites referred to by number.

with the 150-mile gap separating Southern Rhodesia from the specimens of the northern Transvaal, is extremely suggestive. It is curious to note that the Mapungubwe culture in the Limpopo valley lay at altitudes from 1700–2000 feet.

We have here a clue, not only to those areas at one time infested by fly, but also to those areas that might once again become infested should vigilance be relaxed. The former extent of the tsetse country has been described by E. E. Austin * and by R. Newstead,† while the more detailed distribution in Southern Rhodesia is given by R. W. Jack.‡

Uses and Users.

While the Bantu have imitated the Hottentot or Bushman bored stone, and seem to have continued the use of this implement after losing contact with the Bushmen, yet our knowledge of the uses to which the tool was put by the Bantu is less well authenticated than for the Bushmen. This I attribute almost entirely to the fact that this was a woman's digging tool, and that no attempt whatsoever has been made to obtain information from old native women in the Transvaal. All the information seems to be from the men.

Apart from a newspaper article by a Miss E. Bezuidenhout,§ Mrs. Hoernlé is the only person who seems to have placed on record any detailed evidence on the subject. Unhappily neither account can be made to conform with the evidence of the stones themselves.

Miss Bezuidenhout describes an account from an old MuVenda, who told her that these vast stones were threaded on to the horns of a selected beast at the time of the full moon. A fanciful illustration accompanying the article shows no less than fourteen such stones so threaded on the horns of a proud beast. Any additional weight on a cow's horns will depress the head and is irksome. The addition of a weight of at least seventy pounds would be an impossible burden. More important is the evidence of the bore. No hole centre is greater than 4·0 cm., while the maximum distributional frequency is less than an inch (2·4 cm.) and would not permit the passage of even an inch of horn. The tale must be dismissed as a complete fabrication on the part of the genial and possibly mercenary Venda.

* E. E. Austin, A Handbook of the Tsetse-flies, Brit. Mus., 1911.

† R. Newstead, Guide to the study of the Tsetse flies, Liverpool Univ., 1924.

‡ R. W. Jack, Tsetse-fly in Southern Rhodesia, Dept. Agric. Salisbury, S.R., 1918.

§ E. Bezuidenhout, article in Natal Daily News, 26th April 1941.

Mrs. Hoernlé's account * has a closer relationship to fact, but we are again dealing with hearsay evidence. The informant in this case was Mr. W. G. Barnard, and his source of information is an account given by members of the BaRoko and BaKoni tribes, men well over seventy years old. In spite of the fact that the BaRoko were themselves iron-workers and became smiths to their Pedi masters, they say that iron was a rare metal in the Transvaal and only the Pedi overlords could afford to use the metal for such effeminate uses as tilling the soil. "The ordinary tribes-people used very large wooden hoes weighted with bored stones which were fixed to the haft. Both BaKoni and BaRoko men well over seventy years of age have stated that they saw these hoes in use up to sixty years ago. It was only after the opening of the diamond mines . . . (after 1870) . . . that iron hoes became universally used throughout Sekukuniland." A wooden hoe was made to the order of Mr. Barnard, and the illustration shows a posed native using the hoe, upon the tang (not the haft) of which is a bored stone. The specimen is at present in the collection of the Archaeological Survey, Johannesburg, and has also been sketched by Professor van Riet Lowe,† but it is nowhere stated that the specimen was made to order, and exactly copies a modern native iron hoe.

Directly the specimen is handled it becomes obvious that it could not possibly be used in a Transvaal field. The tang on such an implement is limited to 2·4 cm. by the average size of the aperture in the stone. The tang passes through a node of wood in the haft, which is about 7·5 cm. thick at this point. This fragile wooden structure has to bear, not the static weight of from ten to nineteen pounds, but the effects of a violent blow on hard soil, backed by that weight. The stone itself lies above the centre of gravity of the hoe, and the whole would be almost impossible to manipulate, as the handle tends to twist in the grip.

If it is presumed that the weight was on the haft, not on the tang, the structure becomes even more flimsy, as the haft itself is reduced to less than an inch in diameter in order to pass through the stone, and would be further weakened by the hole necessary to take the hoe-head.

If we go three hundred miles south, we have three descriptions of digging-stick used by the Bantu Mpondo women of a century ago.

* A. W. Hoernlé, "A Note on Bored Stones among the Bantu," Bantu Studies, vol. v (1931), pp. 253–255, illus.

† C. van Riet Lowe, "Bored Stones in Nyasaland," S.A.J.S., vol. xli (1941), pp. 320–326.

Here the shortage of iron was much the same. The AmaMpondo depended upon itinerant smiths for their iron, and iron was not worked until the Insimbini mine was started for native use by a European trader. Our first account comes from the pen of Rev. Stephen Kay.* "The latter (digging tools) consist of a kind of wooden spades, which are usually made by the men, and so formed as to render both ends useful." The other two descriptions were collected by myself in 1924. The first was taken from the wife of Pangela, a seventy-year-old member of the AmaMolo clan, living at Hluleka. She described the digging-stick used when she was a child as being made of sneezewood (*Ptaeroxylon utile*) and shaped like a double-ended paddle about 3 feet in length. The blades were oval in plan and flat in section, the haft round. It was used kneeling, a position also described by Kay. My second account came from Chief Victor Poto Bokleni of Western Pondoland, who gave a similar description, adding that a specimen had been sent to the British Empire Exhibition at Wembley. An actual Mpondo digging-stick of exactly this type is in the South African Museum Collection, Cape Town.

It is thus highly probable that these digging-stick weights were employed on the only wooden implement which could reasonably be expected to bear the jar of their weight, namely, a straight digging-stick, or single-ended spade, used as a crowbar for piercing and breaking the soil for a depth of a few inches.

The narrow bore found in many of these specimens suggests one of two things: either that these are unfinished specimens, or that they were at times employed in the manner depicted in Mrs. Hoernlé's article, but on a metal-tanged hoe, and not on a wooden tang. For example, a stone weighing some sixteen pounds (TMP. 4760, New Smitsdorp) would have been of little practical use mounted on a digging-stick 1·3 cm. (half an inch) in diameter. On the other hand, it might well have been designed for use on an iron-tanged hoe. Such use would quickly show conical wear in the hole, but as there are no signs of such wear we are thrown back on the suggestion that these are unfinished specimens.

About half a dozen suggestive specimens (p. 11), all of the smaller Bushman size and therefore not included above, are scattered throughout southern Africa. These show conical holes with one wide and one narrow mouth, instead of the typical hour-glass hole. It is possible that the wider-mouthed specimens may have been bored with stone from one face only, but one or two specimens strongly

* S. Kay, Travels and Researches in Caffraria. London, 1833.

suggest that an iron borer was used either to make the hole or to ream it out afterwards, or perhaps may have helped to shape the bore in later usage. The tang of a metal hoe would provide an excellent instrument for the purpose. Unhappily, as the dimensions conform with those of the VMR. series we have dealt with them as of Bushman rather than of Bantu origin. It is perfectly possible that we are dealing with a local type which will eventually be associable with tribalised Bushman serfs working under the Bantu. The constant and seemingly happy association of Sotho and Bushman at the beginning of last century must not be overlooked.

Mr. Barnard has stated that the BaKoni smiths used the bored stone for a variety of other purposes, such as bellows' nozzles or *tuyères*. Few specimens show evidence of fire, and those that do might more probably have been subjected to the annual Transvaal veld-burnings. A pottery *tuyère* of the normal Bantu and African type, such as occurs from the Ubanghi to the Orange, would seem to be a far more efficient implement.

The BaLemba, according to his article, "used a disc-shaped stone with a small hole in it for burnishing copper and other wires. . . . Further, this wire was flattened on one side for bangle-making and on both sides for bead-making, by being pulled backwards and forwards through a bored stone firmly fixed to a pole or tree."

Here again the evidence of the stones themselves is against the suggestion. In a few instances (*e.g.* the "Zimbabwe" specimen) there are radial cuts or grooves from one mouth of the stone, but in no instance could these have been made by a wire passing through the central hole, as there is always a sharp lip at the junction of hole and groove, showing that the groove was made by a sawing motion across the mouth. Mr. Neville Jones describes one such Bushman specimen (S.R.W.I., 3/356) from Tyger Kloof, and suggests that the grooves are "the result of sharpening tools, probably of metal." The specimens I have seen suggest ownership marks. No disc-shaped stones with a small hole are known from the Transvaal except for the two Pietersburg examples.

Native wire does not show signs of having been flattened by this means. In all the specimens I have examined the longitudinal striations are raised, and must therefore have been a product of the drawplate. The semicircular sectioned specimens are also a product of the drawplate, and the flattened wire is palpably hammered flat. While we have no evidence either from the stones themselves or from the wire used in native ornaments, there is reason to believe that

stones of this sort were sporadically used for a great variety of purposes.

Mr. Barnard's evidence, while given in good faith, appears to show that the male native informants were not clear as to the differences between the hoe and the digging-stick, which is not surprising when we realise that these were both essentially associated with woman's work, and as such would be scorned by the men. Similarly, these natives appear to have gone out of their way to describe possible uses for the bored stones rather than to trust to their memories. I would suggest that the carefully collected testimony of a few old women would yield some interesting facts concerning the use of the Bantu bored stone.

From Abyssinia J. Desmond Clarke sent me a manuscript and photograph,* describing the actual use of the bored stone there. In addition the Abbé H. Breuil has described to me how three workers will dig their straight digging-sticks (not hoes), weighted with bored stones, into the hard earth, each at the angle of a rough equilateral triangle. The whole mass of earth so enclosed is then levered out with one effort, and the solid ground broken up by hammering with the mounted stone. This produces characteristic wear in the stone itself, though whether this eventually produces the peculiar smoothing so typical of many Transvaal Bantu specimens, or whether it leaves a finely pecked surface, I do not know.

M. J. Janmart recently described specimens to me that he has found in north-eastern Angola and the south-west Congo. In some cases these suggest usage about the lips of the bore, while the bore itself is smoothly polished as though by use. In certain cases they suggest that they were used as weights or pulleys, and in one instance a marked groove has been worn into one side of the bore. As the stone hangs naturally from this groove when suspended freely, he regards the groove as a result of long usage on a rope.

Confirmation of the use of bored stones by metal-working peoples near Bethal comes from an independent source. Professor Dart † says: "The fact that both stone cones and perforated stones occur together, as at Heilbron, is suggestive." The stone cones referred to here are highly symmetrical conical objects, about 6 cm. in diameter at the base and tapering from there to a point, forming an elongated ogive from 15 to 25 cm. in length. The most acceptable explanations

* Since published: Man, 1944, Article 25.

† R. A. Dart, "Phallic objects in South Africa," S. Afr. J. Sci., vol. xxvi (1929), pp. 553–562, illus.

for their use are either that they are marline spikes for the making of twisted wire bracelets, or Dart's far more plausible suggestion that they were forms or matrices about which clay was wrapped in order to make the typical *tuyères* or bellows-nozzles used by the Bantu smith. Specimens of *tuyères* I have examined show in all cases that the clay was moulded about some such base, dried, and removed for firing. A wooden matrix would swell and split the wet clay. Dart shows that the stone cone and the bored stone are associated together at Bethal and at Heilbron, and that both are there related to a metal-using people.

There seems to be no authenticated record of the Bantu employing stone-headed clubs. Their use of metals probably allowed them to make the technically simpler wooden knobkiri. It is worthy of note, too, that the root "kiri" appears to be absent in the Bantu languages, and both Afrikaans and English appear to have taken the root over directly from Bushman or Hottentot sources.

As a result of the Preliminary Survey, Mnr. J. B. de Vaal got into touch with Mr. B. D. Malan of the Archaelogical Survey, and the latter has very kindly permitted me the use of his note, from which I translate.

"At the request of Mr. B. D. Malan of the Archaeological Bureau I have tried to discover from various old Venda for what the bored stones, so commonly found on different farms in the Soutpansberg, were used. I showed them three stones, from my collection, that I had found on the farms Mooiplaas, Maanskyn, and Perth. Three Venda told me individually that they used them to tame cattle. One old fellow, Johannes Masindi, about 60 years old, born and bred on the farm Happy Rest, told me the following: Bored stones are used to tie up obstreperous cows when they are milked. A twisted or plaited rope is passed through a hole pierced in the cow's nose, and tied back on the head behind the horns. When the cow has to be milked the rope is fixed with a peg. Where she is to stand a thong is tied to the rope, the bored stone is kept near by, the end of the thong is threaded through the hole, and the cow tied up as tightly as possible. If the cow pulls, she hurts her nose, and has to keep still.

"In addition my informants told me that whenever a young ox has to be broken to the yoke, one of the bored stones is hung about his neck. He is allowed to run the whole day like this, and thus learns to carry a weight, for which a yoke is substituted later. . . . Up to the present I have not been able, following Mr. Malan's request, to discover anything from any old Venda woman on the subject."

This is obviously a secondary use, more recent than the Bantu use of the yoke and the use of the ox as a beast of traction, both

of which came in as European or Indian innovations within the last century.*

The Users.

We have noted above that Mr. Barnard attributes at least some of the bored stones of the Transvaal to the BaRoko and BaKoni tribes, and perhaps to the MaTlala and BaTau, all of whom "were in the country long prior to the arrival of the BaPedi," and some of whom were subject to this later folk. Mr. Barnard at the same time states that the Pedi agriculturalists used iron hoes made for them by the BaRoko. We may presume therefore that the digging-stick stone is not Pedi.

The very definite ancestral and sexual symbolism which the BaVenda attach to old native iron hoes or to rings made from ancient hoe-heads † proves that the Venda regard the iron hoe as sacred to the ancestors. In addition, while certain stones are similarly sacred to the ancestors, these are not bored, nor are they in any way linked with the hoe. We may thus exclude the Venda peoples as users of the bored stone.

Professor van Riet Lowe has found these implements (sites 32 and 33) in definite association with Bantu terrace agriculture. We may presume that the Welgevonden (26) material, from a nearby farm, south of the Komati valley, can be similarly associated. In Rhodesia the association between bored stones and terrace agriculture is less exact, and Hall has suggested that the bored stone from the Zimbabwe region belonged to that cult, and that we are dealing with a single but significant element of the Zimbabwe culture. No specimens appear to have been reported in true association with any sites of this culture-complex, either in Rhodesia or the Transvaal, though carved soap-stone dagga-pipes have been reported.‡

While specimens are sometimes attributed to the "Secocoeni," this term is generally applied to include the natives of the vague area about Lydenburg, once known as Sekukuniland, and agrees quite well with Mr. Barnard's attribution and with the known distribution of specimens. In the same way, many specimens have been called "Makatees" (MaNtatisi); here again we are dealing with a mixed group of broken-down tribes, with a nucleus of BaTlokwa, who followed the chieftainess MaNtatisi in her amazing sweep half across

* Goodwin, Communication has been Established, Methuen, 1937, p. 76.

† H. A. Stayt, The Bavenda, Oxford, 1931, pp. 242–248.

‡ *E.g.* Randall-MacIver, Medieval Rhodesia, London, 1906, p. 58.

the southern continent. In the turmoil of refugees, conquerors, and renegades so typical of the beginning of last century, remnants of any Transvaal tribe might be found among her followers.

The MaNtatisi or Tlokwa Migration.

The story of this extraordinary tragedy may be followed in works by Ellenberger and MacGregor,* by Broadbent,† Robert Moffat,‡ and Thompson.§ A final footnote to the story is to be found in the letters of Lady Duff Gordon.

The BaTlokwa were a tribe originally allied to the BaPedi, in the Magaliesberg area of the central Transvaal. The tribe split into three groups, eventually known as the BaMoKhalong, BaMoKotleng, and the BaMaLakeng, and migrated to the Wakkerstroom district in the south-eastern Transvaal. During the Sekoboto year (the Year of Famine, 1803) these groups were constantly at war, and ended by having no grain or foodstuffs. In the course of these troubles Mokotjo had made himself chief of the Kotleng branch, and took as his queen the daughter of the chief of the BaSia, immediately to the south. She was his first cousin, MoNyalue. When her first child was born it was a daughter, Ntatisi, so according to custom the mother took the name MaNtatisi. That name was eventually to terrorise the central plateau of the northern Free State. To her followers she was known as "Mosayane," the little woman. She bore her husband a son, and in 1813 Mokotjo died, leaving the son an infant; MaNtatisi assumed the regency though still a young woman. She ended by becoming the absolute ruler in the face of strong opposition from her people. The Tlokwa were then living on the immediate west of the Drakensberg, in the Harrismith district near the Elands River, an affluent of the Wilge River, and the population has been roughly estimated as about thirty thousand.

In 1822 began the Lifaqane wars, during which the central plateau of the Free State was invaded in turn by the AmaHlubi, AmaNgwane, BaTlokwa, AmaNdebele, and AmaZulu. At the same time the Hottentot Griquas and Koranas grew restive, and they too invaded part of the same plateau.

South of the Tlokwa lived the BaSia, south-west lived the BaFokeng

* History of the Basuto. London, 1912.

† Rev. S. Broadbent, Narrative of introduction of Christianity among the Barolong. London, 1865.

‡ Rev. R. Moffat, Missionary labours and scenes. London, 1842.

§ G. Thompson, Travels and adventures in Southern Africa. London, 1827.

and other tribes of Sotho extraction, who covered what is now the Free State and Basutoland. Most of these tribes are known to have been in contact and alliance with local Bushman tribes. When the AmaHlubi chief Pakalita crossed the Drakensberg from the turbulent east, the surprised Tlokwa fell back on the BaSia, and in a fit of quixotism refused to form an alliance as there was not enough food for both tribes. They fell back farther west, and overwhelmed the Fokeng, intending to settle there; but Pakalita was fast on their track, and in his turn he was being followed by the victorious Matuwane. The Tlokwa turned and fought, and managed to divert the Hlubi southward across the Caledon River. The Tlokwa followed them and attacked Buthabutha, the stronghold of the young chief Moshweshwe, who was eventually to draw the Basuto people together into a solid nation. Moshweshwe fought a good rearguard action, and retreated into the Basutoland mountains, where he lived with a friendly Bushman tribe.

The Tlokwa now moved down the one bank of the upper Caledon River, while Pakalita and his Hlubi took the opposite bank, each waiting an opportunity to attack the other. After inflicting a defeat on the Hlubi and incorporating members of that tribe, the Tlokwa turned northward once again, defeated a few more tribes, and returned once again to the upper Caledon. Backwards and forwards this extraordinary migration of human termites moved: eating everything that came their way, increasing their numbers with conscripts and prisoners, and depleting their numbers again as the old and the weak fell by the wayside.

The Tlokwa eventually crossed the middle Vaal in January 1823, and engaged the BaRolong on the banks of the Bamboesspruit on the eighteenth of that month. The Tlokwa were checked and weakened at the battle of Tsabalira, and turned south and west as a hopeless rabble looking for some weaker tribe from whom they could recuperate their supplies and warriors. On 26th June they met their Moscow at Takun, between Kuruman and Litaku, where they were routed by 60 mounted and armed Griqua under their chief Waterboer, and pillaged by 2000 cowardly BaTlaping. At that battle the Tlokwa numbered between 40,000 and 50,000 men, women, and children.

The whole story of this last march can be readily constructed from the Journals of Broadbent, Thompson, Moffat, Andrew Smith, and finally Lady Duff Gordon's letters from the Cape. Lady Gordon, writing in 1862, says that "the Mantatees . . . are scattered all over the Colony," and she specifically mentions their presence at Caledon

and at Genadendal, both less than a hundred miles from the Cape of Good Hope. Scattered descendants of these people are still to be found in the south-western districts of the Cape, though many of them have forgotten their immediate ancestry, and have been merged into the heterogeneous "Cape Coloured." I have even heard it said that some call themselves "Griquas," having taken the name of their last conquerors. In the neighbourhood of Malmesbury, Stellenbosch, and the Cape Hinterland generally, the name "Makatees" was regarded as a guarantee of a good and willing farm-labourer up to a few years ago.

The route from the Bamboesspruit near Wolmaransstad to Postmasburg, south of Kuruman, is adequately covered by the list of sites given earlier (p. 194). Whether the bored stones belong to the Tlokwa nucleus or to tribal refugees incorporated along the road does not really matter. The stones do not fit any prehistoric series, but fit excellently as extensions of Bantu graphs and histograms, and they agree with the final route of the defeated army. The average diameter is 14·4 cm., but the height is very variable. Several examples have been bored with iron. The proofs of the association of these examples with the Tlokwa would be threefold: the discovery of numbers of bored stones of these types on the Bamboesspruit, a task that might well be undertaken from Potchefstroom; the discovery of similar stones in the Takun area, research best left to the McGregor Museum, Kimberley; and finally a study of the south-eastern Transvaal with a view to discovering what types of bored stone can be associated with the Tlokwa of Wakkerstrom district, a task best left to Pretoria or Johannesburg.

I have purposely refrained from raising the question of the possible affinities of the largest elements in the Western Bypass (Prehistoric Series) with this movement, although the IB along that route is generally high; the possibilities should not be completely overlooked. The routes are partially the same, and it is highly possible that my analysis here is neither final nor correct in all its details. It depends upon the evidence available to me. Association must help us here.

The consequent logical question, as to whether our Prototype 1 in the Prehistoric Transvaal Series is truly Bushman or is in fact Bantu (or even both), would follow; and finally the possibility that all large specimens, wherever they may be found, are suspect. These questions are ignored. To presume to attempt any answer here would indeed be pyramiding hypotheses, and these questions can only be solved in the light of association and clear thought.

The northern Free State, where the pendulum-swing up and down the Caledon River took place, may well be adequately represented in the National Museum, Bloemfontein, but as Dr. van Hoepen himself proposes to work on his Free State material, I have been unable to gain access to those sources.

We now come to more contentious ground: the further spread of the scattered MaNtatisi movement from Takun. Along the route southward several large bored stones occur, and were included in the Winterveld Prehistoric Series. To cite a few, the two largest Britstown specimens have a low IB (34·1 and 41·3 per cent. respectively) while two beads in the immediate neighbourhood, from Middelwater, have certainly been bored with metal. At Victoria West the largest example has an IB of 36·7 per cent., while at Three Sisters the large specimen has an IB below 40 per cent., and so it goes on. When the Cape is reached we find two outstanding examples, one from Stellenbosch (IB 18 per cent.), the other from Hout Bay (IB 30 per cent.). Both have quite certainly been bored with metal. The Hout Bay specimen (16·0 × 11·0 cm.) agrees with the Transvaal series, but the Stellenbosch example only measures 12·0 cm. × 11·0 cm. In addition the only stone comparable with the Hout Bay example is also from Stellenbosch, though it was almost certainly bored with stone (IB 53·5 per cent.).

There is thus some reason to believe that a trail was laid by the defeated armies of MaNtatisi from the south-western Transvaal to the Cape and perhaps elsewhere. Much remains to be done, but I sincerely hope that this will prove a fertile field for future ethnological research, though clear association between Bantu and bored stone outside the Transvaal is needed. Careful and detailed research must eventually lay bare a story at which I can only hint.

Summary of Conclusions.

1. We may accept as Bantu all circular bored stones, from the general neighbourhood of the Transvaal, with a diameter greater than 15·1 cm. In addition we must include certain stones associable with these; stones known to have been used by the Bantu, or those associated with Bantu sites and ruins; and finally, speculative examples that fall well outside the normal graphical scatter and type-groups of the local Prehistoric Series.

2. The large bored stones are too heavy to have been used on a wooden hoe, though their use on an iron-headed hoe is not precluded.

Mpondo evidence shows that a spatulate digging-stick, used kneeling, was their substitute for the hoe. It is suggested that the Transvaal substitute was similar. Similar evidence is known from Abyssinia.

3. There is evidence that these peoples were essentially cattle-keepers, as their distribution corresponds inversely with that of the tsetse-fly.

4. These stones can be attributed to various Bantu-speaking peoples, among them we can include such tribes as the BaRoko, the BaKoni, MaTlala, BaTau, and BaTlokwa, and possibly the BaSia. We can exclude the BaPedi and BaVenda. Dart further associates examples at Heilbron and Bethel with metal-using peoples, while Lowe associates them at sites 32 and 33 with terrace agriculture.

5. In Southern Rhodesia we may assume that they have been used by an analogous Bantu-speaking people, possibly with terrace agriculture. There is no reason to associate normal bored stones with the Zimbabwe complex. Even if the famous "Zimbabwe area" stone were so associable it is abnormal and had some very different function.

6. While isolated bored stones may well have been used variously as *tuyères*, wire-stroppers, etc. and for controlling restive cows, the stones themselves show no such usage, and there is reason to believe that these uses were incidental, not reflecting the original function.

7. The use of bored stones to decorate cattle horns is precluded by weight and bore. Their use for training young oxen to the yoke must post-date the introduction of the yoke itself from Europe or India.

8. There is as yet no reason to believe that the Bantu made stone-headed knobkiries. Stone beads are attributable to a metal-using people.

9. The use of bored stones as dagga-pipes is mentioned in Appendix I, and the possibility that unfinished pipes may sometimes be included as bored stones is noted.

10. The number of elongated Bantu examples so far available is too small to permit of any deductions as to their relationship to one another, or to the circular specimens.

11. An Index of Bore is developed, and reasons given to assume that stones (over 3·5 cm. in diameter) in which the mouth of the hole is less than 30 per cent. of the total thickness pierced have been bored with metal, probably the tang of an axe or hoe-head.

12. The thickness of the stones pierced and the methods of boring are much the same for the Transvaal prehistoric and Bantu specimens. Cylindrical bores are attributed to usage.

13. The known association of Sotho with Bushmen at the beginning

of the last century cannot be ignored. This appears to show itself in parts of the Transvaal through the conical boring of prehistoric types with metal tools, and the similarity between Bantu and prehistoric Transvaal histograms of IB. The partial contemporaneity and contact of Bushmen and Bantu necessarily follows.

14. The history of the MaNtatisi movement in the first quarter of the last century is outlined; and the incidence of stones, often bored with metal and analogous to Bantu types, is noted along the final stages of their migration.

15. Speculations are raised on the possible relationship between the final scattering of the MaNtatisi and certain metal-bored examples in the Province of the Cape of Good Hope. The relationship of these movements with that outlined in the prehistoric "Western Bypass" is not raised, nor the deductions that might logically follow.

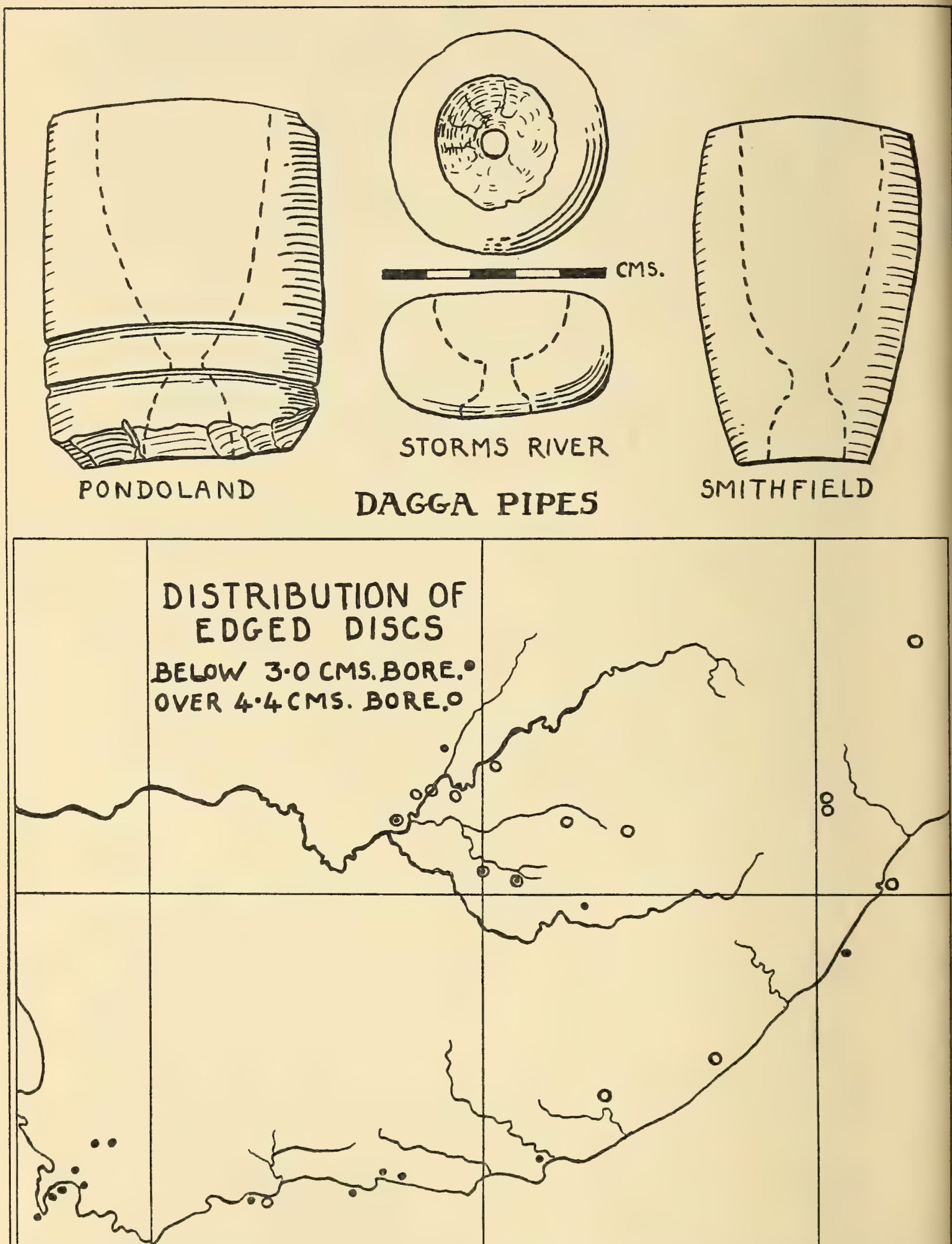


Fig. 9.—Three stone pipe bowls for smoking hemp (above). Distribution of edged discs (below).

APPENDIX I.

The Bored Stone as a Dagga-Pipe.

Mr. Barnard's statement in the paper quoted earlier, that the bored stone was used by the BaRoko "as a bowl for their dagga-pipes," is a misleadingly bare presentation of the facts. Bored stones of a sort were certainly used as dagga (hemp, *chanvre, Cannabis* sp.) pipes by both Bantu and Hottentot peoples, and are still so used, but the pipe bowl is somewhat differently made. While authenticated examples occur as far afield as Barotseland and the Cape, and are in use in Pondoland, Basutoland, Zululand, and elsewhere, nothing has so far been done on their typology or distribution. Material might well be based upon examples confiscated in magistrates' courts. Their manufacture in Southern Rhodesia may go back a few centuries, and Randall-MacIver mentions an example found in a midden of Zimbabwe culture. But even if the hemp was originally introduced by the Arabs, there is no evidence that this occurred early, or that the method of making pipes was ever anything but an adaptation of the usual technique used in making the bored stone.

A study of both complete and incomplete specimens is needed. I here illustrate three, all markedly different. These show that the section of the bore does not resemble that of the normal bored stone. There are here two portions: the deeper hole provides the bowl of the pipe, and the shallower is only wide enough to permit the insertion of a reed stem. These two are joined by a narrow aperture, about 0·5 cm. in diameter. The holes are more tubular, and the examples given all suggest that the hole was enlarged and shaped, after the two pecked depressions met in the heart of the stone, by tooling. There is thus a marked step in the sections, towards the aperture.

The two larger specimens have had a pebble origin, and were originally far larger than they are now, but have been rubbed and ground to shape. The Smithfield example is an almost perfect barrel shape, thinning slightly to one end. The Mpondo specimen is less regularly ground, and was probably rubbed down on a flat stone, so that the remnants of faceting are visible down the outer face of the cylinder.

The pebble was therefore bored, then ground laboriously to shape, and finally the interior of the bowl was dug out with some metal tool until it had a reasonable capacity. To have shaped the stone before boring would have been fatal.* The Smithfield specimen (sent

* Since writing this note, a dagga-pipe, in process of manufacture, has come to my notice. It is from Weenen, Natal, and was shaped to a "Christmas cracker" shape (a cylinder with two waists) and had broken directly boring had been commenced.

by Dr. Kannemeyer to the South African Museum) is the most perfect, though the example from Hluleka on the western Pondoland coast is good. Both these are heavily impregnated with black hemp-juice from use. Known dagga-pipes are ignored in the body of this paper. A few thistle-shaped examples are known to exist among the Zululand tribes, probably more closely related to the Barotseland forms. These occur (I believe in both areas) in stone or in pottery.

These various forms are not exclusively Bantu, and are known to have been in use among the Hottentots, though there is not the slightest evidence that their use was earlier than the historic period in South Africa. There are two other forms of pipe in use among the Bushmen and Hottentot peoples, the "trap-drain" form, used exclusively for dagga, and the "cigar-holder" type which seems to have come in with tobacco, and is not suited to hemp at all.

APPENDIX II.

Edged Discs and Arm-Rings.

The figures and available data on these examples of the bored stone have been published elsewhere,* and the reader is invited to turn to that reference for a complete survey of the question, as I have no intention of repeating the body of that paper here.

The edged disc is a discus-like stone, bored in the centre, and either planoconvex or biconvex, so that a polished edge forms the outer boundary of this circular stone. This has in certain instances been reamed out in such a way as to increase the central hole to dimensions that suggest its use as an arm-ring. In only one instance could the stone have been used as an arm-ring for an adult. It was found that two types could be differentiated; those with an aperture under 3 cm., and those with an aperture greater than 4·4 cm., and the list of sites was given in that paper. Figures for two further specimens have come to hand; one from Boetsap falls into the small-bored series, and another from a midden site at the Bashee River mouth falls into the large-bored series. The accompanying map, not hitherto published, includes these two. The small-bored examples are marked as dots, the large-bored as circles.

* A. J. H. Goodwin, South African Journal of Science, vol. xl, pp. 296–302, 1943.

CORRIGENDA.

Map 2, p. 110. *For* Colesburg *read* Colesberg.

Map 4, p. 112. *For* Fullerton *read* Fullarton.

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OF THE

SOUTH AFRICAN MUSEUM

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2. *Craniometric Survey of the South African Museum Collection of Bushman, Hottentot and Bush-Hottentot Hybrid Skulls.*—By J. A. KEEN, Department of Anatomy, University of Cape Town. (With Plates I–IV.)

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2. *Craniometric Survey of the South African Museum Collection of Bushman, Hottentot and Bush-Hottentot Hybrid Skulls.*

By J. A. Keen,

Department of Anatomy, University of Cape Town.

(With Plates I–IV.)

The collection of crania in the South African Museum representing the aboriginal peoples of the Union was started at a time when Mr. W. L. Slater was the Director (1896–1906), and was continued by Dr. L. Peringuey (1906–24), under whose directorship the collection grew to considerable dimensions. In 1923 Dr. Peringuey decided to submit the collection, about a hundred complete crania and other skeletal material, to Professor E. Pittard, the eminent anthropologist, of the University of Geneva. Professor Pittard undertook to make a detailed study, and for many years this valuable Bushman and Hottentot material remained in Switzerland.

During the directorship of Dr. E. L. Gill (1925–42) the Bushman and Hottentot anthropological collection continued to increase through gifts of accidental finds and also through the exhumation of graves, as occasion arose. In 1939 a portion of the skeletal material, originally sent away by Dr. Peringuey, returned to Cape Town, the remainder not until 1948, owing to the outbreak of the Second World War. The whole collection is now again housed in the South African Museum and consists of 205 adult crania, 121 of these with mandibles. I am indebted to Dr. K. H. Barnard, the Director of the South African Museum, for permission to study these crania and to present a general survey. Each skull was measured, following a standardised method which had previously been applied to groups of European, Bantu and Cape Coloured crania, and also to a very similar collection of Bush-Hottentot material in the Nasionale Museum, Bloemfontein (Keen, 1947).

Previous Studies.—A subgroup of the collection, viz., 53 crania exhumed from graves near Colesberg in the Cape Province, was studied by Slome (1929) and the results published under the title of the

"Osteology of a Bushman tribe". During the time that the Peringuey collection of skulls was in Switzerland, Professor Pittard and his co-workers published many articles bearing on special points in craniology which interested them. However, a general craniometric survey of the collection, as a whole, had not been made previously.

Methods.

The skull measurements.—The list of skull measurements which was selected is seen in Table I. It includes all the usual cranium and face dimensions and indices which are employed in physical anthropology. The first seven measurements and four indices concern the *vault* of the skull. The remainder concern the *facial part* of the skull, and are designed to study the configuration of the orbit, nose and mandible. Most of the measurements were made according to the instructions given in R. Martin's text-book (1928), but a few require special mention.

The *length of mastoid process* is obtained by drawing a line across the root of the mastoid process parallel to the Frankfort plane, at the level of the upper margin of the suprameatal triangle. On that line take a point which is vertically above the tip of the mastoid process, and then measure the distance between that point and the tip of the mastoid process. If the suprameatal triangle is ill-defined, the level of the upper margin of the external auditory meatus is used.

The *interorbital interval* ("Zwischenaugenbreite") is defined by Martin (1928) as the straight distance between the two dacrya, the dacryon being the point on the inner margin of the orbit where the frontal bone, the frontal process of the maxilla and the lacrimal bone meet. The sutures tend to disappear with advancing age, especially that between the maxilla and the lacrimal bone, and in many skulls it is impossible to find the dacryon. On account of this difficulty I have consistently interpreted the interorbital distance as being the maximum distance obtainable across the bridge of the nose when the caliper points are placed on the upper part of the lacrimal bone, or on the fronto-lacrimal suture, if this is visible.

The *minimum ramus breadth* is the smallest distance obtainable between the front edge and the posterior border of the ramus of the mandible. The *minimum ramus height* is the distance between the lowest point of the mandibular notch and the lower border of the mandible, the measurement being made along a line at a right angle to the line of the minimum ramus breadth measurement. These two mandible dimensions and an index obtained from them have been shown to have a special significance in the differentiation between Bushman, Hottentot and Bantu crania. The angle at the nasion is the forward angle formed at the nasion between straight lines joining nasion to glabella and nasion to rhinion; a simple method of measuring this profile angle has been described (Keen, 1949).

Methods of calculation.—The frequency distribution of each measurement was tabulated, after choosing a suitable class interval, and the *means* (M) and *standard deviations* (σ) were determined in the usual manner. In order to compare the data obtained in a related population group, calculations were made to determine the *critical ratios* between the means of each dimension or index. This calculation involves first of all the determination of the *standard error of the mean* (ϵ), according to the formula $\epsilon = \sigma/\sqrt{n}$ (n = number of observations). The standard error of the mean for one group may be written as ϵ_1, and for another group as ϵ_2. The next step was to find the standard error of the difference (σ_{diff}), using the formula $\sigma_{\text{diff}} = \sqrt{\epsilon_1^2 + \epsilon_2^2}$. The critical ratio is given by the formula:

$$\text{critical ratio} = \frac{\text{actual difference between the two means}}{\sigma_{\text{diff}}} \text{ or } \frac{M_1 - M_2}{\sqrt{\epsilon_1^2 + \epsilon_2^2}}.$$

According to the laws of probability, the significance of the numerical values obtained for the critical ratio is as follows. If the critical ratio is 2·5, a difference between the two means equal to or greater than the observed difference is not likely to be found in more than 6 out of 1000 comparisons of groups drawn from similar population groups. Hence we are justified in concluding that the observed difference is almost certainly due to systematic and not to chance factors; in other words, that the observed difference is significant. Such a conclusion is all the more justified if the critical ratio exceeds 2·5, the significance becoming more and more important as the critical ratio increases.

Some observers are prepared to accept critical ratios of 2 or even slightly less as indicating differences which are statistically significant. However, in Table III the differences between the means have been noted as significant only when the critical ratio was 2·5 or more.

Results.

The results of the analysis of the dimensions and indices of the 205 crania in the collection are presented in Table I. Included in the series are 12 crania which are labelled *Griqua* in the Museum records. A study of the osteology of the Griquas was made by Brink (1923), who described this population group as a Hottentot clan in which some European admixture had occurred. On examination, these Griqua skulls in the collection showed no evidence of such admixture. Nine out of the 12 'Griqua' skulls could be classified unhesitatingly as Bush-Hottentot hybrid skulls. Of the remaining three, two were very large skulls showing the characteristics of the pure Hottentot. The third one, although resembling the Hottentot type in most of its dimensions, had a gnathic index of 104, which raised the question of a possible Negro admixture.

Table I.—Showing the Ranges, Means and Standard Deviations of the Cranial and Facial Measurements and Indices of the South African Museum Collection of Bushman, Hottentot and Bush-Hottentot Hybrid Crania.

(205 skulls; measurements in millimetres unless stated otherwise.)

	Range	Mean $\pm\epsilon$	σ
1. Maximum length	157–200	179·3 ± ·5	7·1
2. Maximum breadth	119–149	132·3 ± ·4	5·6
3. Minimum frontal breadth	82–111	94·5 ± ·3	4·6
4. Basion-bregma height	112–146	126·6 ± ·4	6·3
Breadth/length index (2/1)	64·4–86·6	73·9 ± ·3	3·8
Height/length index (4/1)	60·7–78·7	70·7 ± ·2	3·5
Height/breadth index (4/2)	81·7–113·7	95·9 ± ·4	6·0
Transverse fronto-parietal index (3/2)	62·6–83·4	71·5 ± ·3	4·0
5. Horizontal circumference	456–560	502·5 ± 1·2	16·7
6. Cranial capacity (c.c.^{3})	989–1615	1238·8 ± 7·7	109·7
7. Length of mastoid process	13–36	24·4 ± ·3	4·1
8. Length of base	85–110	96·8 ± ·3	4·9
9. Length of face	82–115	95·6 ± ·4	6·0
Gnathic index (9/8)	89·6–108·0	98·7 ± ·3	3·7
10. Maximum bizygomatic diameter	108–142	123·5 ± ·5	6·8
11. Total face height	82–123	104·5 ± ·7	7·5
12. Upper face height	50–77	62·8 ± ·4	5·2
Total facial index (11/10)	70·1–99·2	85·4 ± ·5	5·5
Upper facial index (12/10)	41·5–60·5	51·0 ± ·3	3·6
13. Breadth of orbit	35–47	40·9 ± ·1	2·2
14. Height of orbit	25–37	31·1 ± ·1	2·2
Orbital index (14/13)	63·0–89·7	76·3 ± ·4	5·1
15. Interorbital interval	18–34	26·2 ± ·2	3·0
16. Nasal width	20–32	25·8 ± ·2	2·3
17. Nasal height	36–52	45·4 ± ·2	3·4
Nasal index (16/17)	46·7–69·4	57·9 ± ·3	4·6
18. Minimum ramus breadth	27–45	34·9 ± ·3	3·4
19. Minimum ramus height	32–53	41·2 ± ·4	4·8
Index of ramus (18/19)	62·5–114·3	85·2 ± ·9	9·7
20. Angle of nasion	123–169°	151·1 ± ·6°	9·0

Further, one must admit that an occasional skull of a Cape Coloured may have been added to the collection, the cranium being labelled Hottentot or Bush-Hottentot hybrid. With these reservations in mind, we may affirm that the ranges, means and standard deviations of the 20 skull dimensions and 10 indices, seen in Table I, are representative of the Bushman, Hottentot and Bush-Hottentot hybrid peoples, when they are placed together as one entity.

Provenance and Classification of the Crania.

Nearly every skull in the collection had an entry in the Museum records to indicate when it reached the Museum, who presented it, and from which locality it came. The skulls originated from an extensive area which included the whole of the Cape Province, as well as the territory along the west coast of South Africa which formerly was the German colony of South West Africa—that is, Ovamboland, Namaqualand north of the Orange River, and the adjoining Kalahari Desert. An obvious method of subdividing the crania was on a geographical basis, as follows:—

(*a*) Crania which came from the interior of the Cape Province: 71.
(*b*) Crania which came from Ovamboland, Namaqualand, and the Kalahari Desert: 63.
(*c*) Crania which came from localities within a fifty-mile radius of Cape Town: 25.
(*d*) Crania from localities situated in the southern coastal strip of the Cape Province: 19.

With the remaining 27 crania there was no information as to the place of origin. When Dr. Peringuey submitted the material to Professor Pittard in 1923, the collection of crania was about half the size of the present one. Dr. Peringuey divided the skeletal material partly on a cultural and partly on a geographic basis, and suggested the following subdivisions: (1) Crania obtained from coastal rock shelters. (2) Crania obtained from sand-dunes and coastal middens. Both these groups, according to Peringuey, would represent the Strandloper race. (3) Crania from the interior of the Cape Province, representing mainly the inland Bushman. (4) Crania from Ovamboland, Namaqualand, and the Kalahari Desert, which were also said to be mainly Bushman material.

From the letters exchanged with Professor Pittard, which are preserved in the files of the South African Museum, it is clear that

Dr. Peringuey considered that the Hottentots were a subdivision of the Bantu, the latter being defined as central African Negros who had undergone a "semitic infiltration". The Hottentots are said to have invaded South Africa, where they encountered an aboriginal race, the Bushmen, whom they conquered. The Hottentots mixed with the Bushmen and as a result their physique became considerably changed. This was the original view put forward by Stow (1905). The resultant mixed group settled along the sea-coast, while the original Bushmen were displaced inland. For the mixed Bush-Hottentot group, which after a time became relatively homogeneous, Dr. Peringuey preferred the name Strandloper, no doubt having been influenced by Shrubsall (1907). This author insisted on the very distinct racial characteristics of the Strandlopers, who were said to be a purer group than the Bushmen, and to be distinct from the Hottentots.

In the numerous anthropological studies by Professor Pittard and his co-workers, the grouping suggested by Dr. Peringuey was rigidly adhered to, on the assumption that there was some inherent fundamental difference. After discarding damaged crania and juvenile ones, and further subdividing them rather arbitrarily into male and female, the resultant subgroups became very small (often less than 12), so that the means of the various dimensions and indices given in Professor Pittard's writings were not particularly helpful

A collection of crania of the Bushman and Hottentot population groups has also been made by the Nasionale Museum, Bloemfontein. Here the skulls are subdivided into "typical" Bushman, "typical" Hottentot, and the intermediate Bush-Hottentot hybrid. The Hottentot material had been obtained in the course of several expeditions to collect old Hottentot skulls from graves along the Orange River between Kakamas and the Falls, the Hottentot graves being marked by conical mounds of stones (Dreyer and Meiring, 1937). This Orange River region was occupied by relatively pure Hottentot tribes within historical times (Maingard, 1932).

The "typical" Hottentot cranium is large (mean maximum length: 192 mm.), narrow in the forehead region and markedly dolichocephalic (mean breadth/length index: 70·5); while the "typical" Bushman cranium is small (mean maximum length: 174 mm.), relatively wide in the forehead region and with a tendency to brachycephaly (mean breadth/length index: 75·8).

An analysis of the skull dimensions and indices of the Bloemfontein crania (Keen, 1947), and a comparison with the data obtained from

the present collection, reveals differences in certain directions. But these differences are easily explained by a preponderance of large Hottentot crania in the Nasionale Museum collection. In the Bloemfontein series the large "typical" Hottentot crania formed 35 per cent. of the total number (35 out of 99 skulls), while in the present collection the "typical" Hottentot crania are only 19 per cent. of the total (38 out of 205).

The experience gained with the material in the Nasionale Museum, Bloemfontein, enabled me to subdivide the present series of crania into the three groups of Bushman, Hottentot, and Bush-Hottentot hybrids, and the results were as follows. Among the 205 crania, 46 were small mesocephalic skulls which were called "typical" Bushman, *i.e.* 22 per cent. On the other side were 38 large dolichocephalic crania which were called "typical" Hottentot, *i.e.* 19 per cent. The remaining 121 crania (59 per cent.) were classified as Bush-Hottentot hybrid. The skulls were also divided into male and female; but little importance is attached to this, because the sexing of crania, in the absence of other skeletal data, is recognised to be very uncertain.

Where the dividing lines are drawn between the characteristic Hottentot, Bush-Hottentot hybrid, and Bushman is a matter of choice which rests with the observer. But the recognition of the tendency in one or other direction, and the definition of the extreme types at either extremity, are tasks which present no particular difficulty.

If an analysis is made of the two extreme groups, based solely on the two factors of maximum length and breadth/length index, we obtain the following results. The 46 Bushman crania in this series gave a mean for maximum length *172 mm.* (range 157–177 mm.), with a mean breadth/length index of *78*—that is, in the mesocephalic class (76·0–80·9). The 38 Hottentot crania gave a mean for maximum length of *189 mm.* (range 183–200 mm.), with a mean breadth/length index of *70*—that is, well into the dolichocephalic class (x – 75·9). In between lay the large group of Bush-Hottentot hybrids. These data show a close approximation to the criteria established when defining "typical" Hottentot, "typical" Bushman, and Bush-Hottentot hybrid crania in the previous study of the Bloemfontein series.

If we accept the method of classifying the present series into the three types, it becomes of special interest to study their relative distribution in the various subdivisions based on the geographical origin of the crania (see Table II). Among the crania originating

from the interior of the Cape Province the small mesocephalic Bushman skull was found more often than the large dolichocephalic Hottentot cranium. In the material from South West Africa and the Kalahari Desert the proportions are reversed (Table II). Among the crania from the southern coastal strip of the Cape Province and near Cape Town the characteristic Bushman type is often seen, the Hottentot type much less often. In all three geographical groups the Bush-Hottentot hybrid skulls are the most numerous, as applies to the collection as a whole.

Table II.—Showing the Percentage Distribution of the Three Types when the Crania are arranged according to their Geographical Origin.

	Bushman.	Hottentot.	Bush-Hottentot Hybrid.
From the interior of the Cape Province: 71 skulls.	17 24%	13 18%	41 58%
From Ovamboland, Namaqualand, and Kalahari Desert: 63 skulls.	9 14%	14 22%	40 64%
From southern coastal area and near Cape Town: 44 skulls.	17 39%	4 9%	23 52%

Dr. Peringuey had informed Professor Pittard that the crania from the interior of the Cape Province and those from South West Africa and the Kalahari Desert were representative of the Bushmen, placing the hybrid crania, which he preferred to call Strandlopers, along the coastal strip. Actually the South West Africa and Kalahari Desert group contains the highest proportion of "pure" Hottentot crania. Thus we can explain such disturbing statements as that made by Professor Pittard (1927) to the effect that the Bushmen of the Kalahari are dolichocephalic. The analysis was based on the examination of 27 crania. The material, as becomes obvious, was largely Hottentot and Bush-Hottentot hybrid, and not Bushman. The characteristic Bushman type of cranium appears to be best represented among

those obtained from middens and rock shelters along the coast and near Cape Town.

Australoid Type of Hottentot.—A smooth forehead region, with absent or only slightly marked eyebrow ridges, is characteristic of Bushman and Hottentot crania. Occasionally the glabella is prominent and continuous at the sides, with definite supra-orbital ridges. Among the 205 crania there were 7 (3 per cent.) where this feature was noted. Of the 7 skulls with marked supra-orbital ridges, 3 were large crania which had been called Hottentot, and the other 4 had been grouped as Bush-Hottentot hybrid.

Well-marked supra-orbital ridges were described by Broom (1941) as occurring among the Korana. In order to explain the existence of such australoid crania among them, it was postulated that an unknown australoid type, now quite extinct, mixed with the Korana race. The Korana are considered by Broom to be a purer type than the Hottentot. The latter, according to this author, were a hybrid race resulting from the crossing of Bushmen and Koranas. It has been argued elsewhere (Keen, 1943) that the Koranas should be considered to be a tribe of the Hottentots, on historical grounds and also because their cranial dimensions conform closely to the criteria established for the Hottentot group.

Comparison between Bushman and Hottentot Crania.

Differences.—Many of the differences between the "typical" Bushman and the "typical" Hottentot are accounted for by the fact that the Hottentot skull is considerably larger than the Bushman skull, and this is mainly shown in the dimension of *maximum length.* As regards *maximum breadth,* the Bushman cranium is relatively wider than the Hottentot one. In consequence, the *breadth/length index* is a larger figure in the Bushman, bringing these skulls into the mesocephalic class (76·0–80·9), while the Hottentot skulls are decidedly dolichocephalic (Plate III).

The facial part of the skull, even more than the vault, reflects the difference in general size. Of the two facial dimensions, *total face height* and *upper face height,* the latter is relatively more affected. Accompanying the smaller upper face is a reduced *nasal height* in the Bushman. The Bushman face, as compared with the Hottentot, is compressed from above downwards, and this reduction in height affects more particularly the part of the face between the nasion and the prosthion. Both *facial indices* are smaller in the Bushman, giving the face a shape which tends to be somewhat oblong from

side to side, while the Hottentot face is more square-shaped. The *nasal index*, on the average, shows a higher figure in the Bushman, this being due to a relatively greater reduction in nasal height than in nasal width, as compared with the Hottentot. The Bushman is more platyrhine than the Hottentot (Plate I).

Resemblances.—Both Bushman and Hottentot crania have a low vault of the skull, the mean for *basion-bregma height* being 126 mm., as compared with a mean of 133 mm. in a group of Bantu crania. Bush-Hottentot crania, as a rule, have a short *mastoid process*, and this is very evident if they are contrasted with European or Negro crania. Bushman and Hottentot crania are orthognathous with a mean for the *gnathic index* of 98·7, as compared with a mean of 101·4 for the Bantu (Plate II).

The *orbital index* is small, on an average, in Bush-Hottentot skulls, indicating that the orbital aperture tends to be narrower from above downwards. The zygomatic bones are prominent and push the inferior orbital margin upwards to some extent. The prominent cheek-bones in the faces of the South African aboriginal peoples was a feature which was noted by the early Dutch settlers. The narrower orbital aperture in a vertical direction contrasts with the more rounded orbital aperture in European and Negro crania.

An important characteristic of the Bushman and Hottentot crania is seen in the shape of the ramus of the mandible, which tends towards a square shape (Plate IV). This gives a high *index of ramus*, in contrast with the more elongated ramus of the Negro and European mandible with a much lower index. But perhaps the most striking and important character seen in the facial part of the skull is the "flatness" of the nasion region, so very obvious in all Bushman and Hottentot crania (Plate I). A flat bridge of the nose goes *pari passu* with a large profile *angle at the nasion*; the mean for the whole group of crania was 151° (Table I). The mean for the angle at nasion in 220 Bantu crania was 138°, and in 186 European crania it was 127°. The flatness of the nasion region is seen typically in Mongolian skulls, and the Bushmen and Hottentots further share skin colour, the Mongolian fold at the inner margin of the eye, and the prominent cheek-bones with certain Asiatic population groups.

The factor of "flatness" of the nose appears to be linked with a wide *interorbital interval*, which was stated by Shrubsall (1907) to be a characteristic of the Bushman cranium. *A priori*, one expected that the factor of "flatness" of the nose, as expressed numerically by the size of the profile angle at the nasion, would be positively correlated

with a wide interorbital interval. But when the coefficient of correlation was calculated on the data provided by these 205 crania, no correlation was found to exist between the two factors.

The difficulties of measuring the interorbital interval have been referred to previously. When the interorbital interval was measured as described earlier, the various racial groups showed very slight differences in the means: 26 mm. in the present series of Bush-Hottentot skulls, 27 mm. in the Bantu crania, and 25 mm. in the European series, in spite of the very large differences between them in the means for the angle at nasion. The nasal bones and the frontal processes of the maxillae are flattened out, and the bridge of the nose itself is wider in the Bush-Hottentot crania. But there is no corresponding increase in the distance between the front parts of the inner walls of the right and left orbits.

The various points of difference between Bushman and Hottentot crania, and the characteristics common to both groups, can be seen to a greater or less extent in the photographs of three representative crania (Plates I–III). Only one of these had a mandible available, and therefore they are shown without the lower jaw.

Comparison with the Cape Coloured Crania.

Of the present-day population groups in the Union of South Africa the Cape Coloured people are the most closely allied to the aboriginal Bushmen and Hottentots; the two latter population groups are becoming extinct. It seemed of interest to make a comparison between the crania of the aboriginal peoples and those of the present-day Cape Coloureds. The data for the Cape Coloureds came from a recent craniometric study (Keen, 1951) in which male and female crania were analysed separately. For purposes of this comparison the midway mean between the male and female means was used, on the assumption that in the Bush-Hottentot crania of the S.A. Museum collection we were also dealing with male and female in equal proportions.

The means for the various dimensions and indices of the two series of crania are shown in Table III, together with the results of calculations of the critical ratios of the differences in the means. A glance at the column of the critical ratios shows at once that the significant differences affect the dimensions and indices of the facial part of the skull much more than those of the vault part. The importance of the facial part of the skull in racial differentiation has been stressed by

Table III.—Showing the Means of the Various Dimensions and Indices in the Bush-Hottentot Crania of the S.A. Museum Collection side by side with the same Measurements in Cape Coloured Crania, together with the Critical Ratios of the Differences, provided these were 2·5 or more.

(Measurements in millimetres unless stated otherwise.)

	S.A. Museum Collection (205 skulls).	Cape Coloured Group (201 skulls).	Critical Ratio of Difference.
Maximum length	179·3 ± ·5	180·8 ± ·7	2·5
Maximum breadth	132·3 ± ·4	134·1 ± ·6	
Minimum frontal breadth	94·5 ± ·3	94·6 ± ·5	
Basion-bregma height	126·6 ± ·4	129·2 ± ·5	4·0
Breadth/length index	73·9 ± ·3	74·2 ± ·4	
Height/length index	70·7 ± ·2	71·5 ± ·3	
Height/breadth index	95·9 ± ·4	96·5 ± ·5	
Transverse fronto-parietal index	71·5 ± ·3	70·5 ± ·4	
Horizontal circumference	502·5 ± 1·2	504·9 ± 1·6	
Cranial capacity (c.c.^{3})	1238·8 ± 7·7	1264·6 ± 13·8	
Length of mastoid process	24·4 ± ·3	27·7 ± ·4	6·6
Length of base	96·8 ± ·3	97·6 ± ·5	
Length of face	95·6 ± ·4	96·4 ± ·7	
Gnathic index	98·7 ± ·3	98·9 ± ·5	
Maximum bizygomatic diameter	123·5 ± ·5	123·7 ± ·6	
Total face height	104·5 ± ·7	112·2 ± 1·0	5·2
Upper face height	62·8 ± ·4	66·5 ± ·6	5·1
Total facial index	85·4 ± ·5	90·6 ± ·7	6·5
Upper facial index	51·0 ± ·3	53·6 ± ·4	5·2
Breadth of orbit	40·9 ± ·1	42·2 ± ·2	5·9
Height of orbit	31·1 ± ·1	32·8 ± ·3	2·8
Orbital index	76·3 ± ·4	77·8 ± ·4	2·6
Nasal width	25·8 ± ·2	25·7 ± ·3	
Nasal height	45·4 ± ·2	47·9 ± ·4	5·5
Nasal index	57·9 ± ·3	54·4 ± ·6	5·2
Minimum ramus breadth	34·9 ± ·3	31·5 ± ·4	6·8
Minimum ramus height	41·2 ± ·4	45·0 ± ·6	5·3
Index of ramus	85·2 ± ·9	70·6 ± 1·2	9·7
Angle at nasion	151·1 ± ·6°	141·1 ± 1·2°	7·7

many anthropologists, and we may quote Sir Arthur Keith (1929) who said "When we have to distinguish one race of mankind from another, we obtain more assistance from the facial than from the cranial parts of the skull".

Where the average dimensions of the Cape Coloured crania differed from the Bushman and Hottentot dimensions, these Cape Coloured means had moved towards the European and Negro means. When the genetic influence of the two last groups tended in opposite directions, as *e.g.* in *nasal width*, the Cape Coloured means remained practically identical with those of the Bushman and Hottentot crania (Table III).

Although it is seen that many skull dimensions and indices show significant differences when a comparison is made between the Cape Coloured on the one hand, and Bushman and Hottentot crania on the other hand, these differences, as a rule, are less than those which appear in comparisons between Cape Coloured and Bantu, or Cape Coloured and European crania. Thus we see that the Bush-Hottentot inheritance exerts a powerful genetic influence on the Cape Coloureds, *e.g.*, the flat nasion region with a wide bridge of the nose, the prominent zygomatic bones, the absence of prognathism and the square-shaped ramus of the mandible (Plate IV).

Discussion.

In the seventeenth-century records of the Dutch settlers different names were used when the aboriginal tribes are mentioned. Apart from the name Hottentots, they were sometimes called the Watermans, sometimes the Strandlopers (beachrangers). The predatory habits of the inland Bushmen were well known, but it was supposed that they were merely another Hottentot clan (Theal, 1888). From this original error much confusion has arisen, and even to-day anthropologists are not agreed. One school believes that the Hottentots and the Bushmen are so much alike in physical characters, and so distinct in appearance from the other inhabitants of southern Africa, that one cannot separate them into two races. They should be considered as subgroups of one race, viz., the *Khoisan race* (Shapera, 1930; Galloway, 1933); the term *Bush race* is often used with the same meaning, *i.e.* to include both Hottentots and Bushmen. The other school of anthropologists (Broom, 1923; Dreyer, 1937; Drennan, 1938) considers that the Hottentots and the Bushmen are sharply differentiated racial groups, although extensive hybridisation of the two peoples

had produced the intermediate Bush-Hottentot type, and clear-cut separation is absent.

In a previous study of Bushman and Hottentot crania, I followed the view that the Bushmen and Hottentots were distinct population groups. The characteristic or "typical" Bushman crania are easily separated from characteristic Hottentot skulls, as they show very opposing tendencies. Crania which in the past have been called *Strandloper*, on account of their being found in association with coastal middens and rock shelters, are proving to be Hottentots or Bush-Hottentot hybrid types (Drennan, 1938; Keen, 1941). For this reason the term Strandloper should no longer be used in a racial sense, as denoting a distinct population group. The Strandlopers are a subdivision of the Hottentot group with a propensity for living along the seashore. The same criticism applies to the term *Korana*; they should be considered as a clan of the Hottentots. Two Korana skulls obtained from graves in the Orange River area near Upington proved on analysis to conform very closely to the criteria established for the Hottentot race. Further, it was from graves along the Orange River between Kakamas and the Falls that the Bloemfontein Nasionale Museum obtained its collection of "typical" Hottentot crania.

The difficulties which face anthropologists in their study of the aboriginal peoples of the Union of South Africa will be lessened considerably if a clear differentiation is made between the two racial groups, the Bushmen and the Hottentots, recognising at the same time that there was extensive hybridisation between the two groups, and that many crania represent the intermediate type, viz., the Bush-Hottentot hybrid.

Summary.

The author made a craniometric study of a collection of 205 skulls in the South African Museum, Cape Town, which appertain to the aboriginal peoples of the Union of South Africa, the Bushmen and the Hottentots. The crania were submitted to a standard set of 20 measurements from which 10 indices were calculated. The means of the dimensions and indices are given in tabular form, together with the ranges and standard deviations.

The crania were divided into three types, Bushman, Hottentot and Bush-Hottentot hybrid, and an analysis was made of the distribution of the three types among the crania originating from different areas. It was found that the Hottentot type occurred more frequently among the crania originating from South West Africa and the Kalahari Desert, the Bushman type more often among the crania originating

from the interior of the Cape Province and along the southern coastal area.

The differences and resemblances between characteristic Bushman and Hottentot crania are described. A comparison was made between the Bush-Hottentot crania and the allied Cape Coloured type. The significant differences in the means could be explained by the genetic influence of the other racial groups on the Cape Coloured. The resemblances demonstrated the strong influence of the Bush-Hottentot inheritance.

The author supports the view that the Bushmen and the Hottentots are distinct racial groups, in spite of extensive hybridisation which has taken place and which complicates the problem. Lastly, it is argued that the terms Strandloper and Korana should no longer be used in a racial sense.

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EXPLANATION OF PLATES.

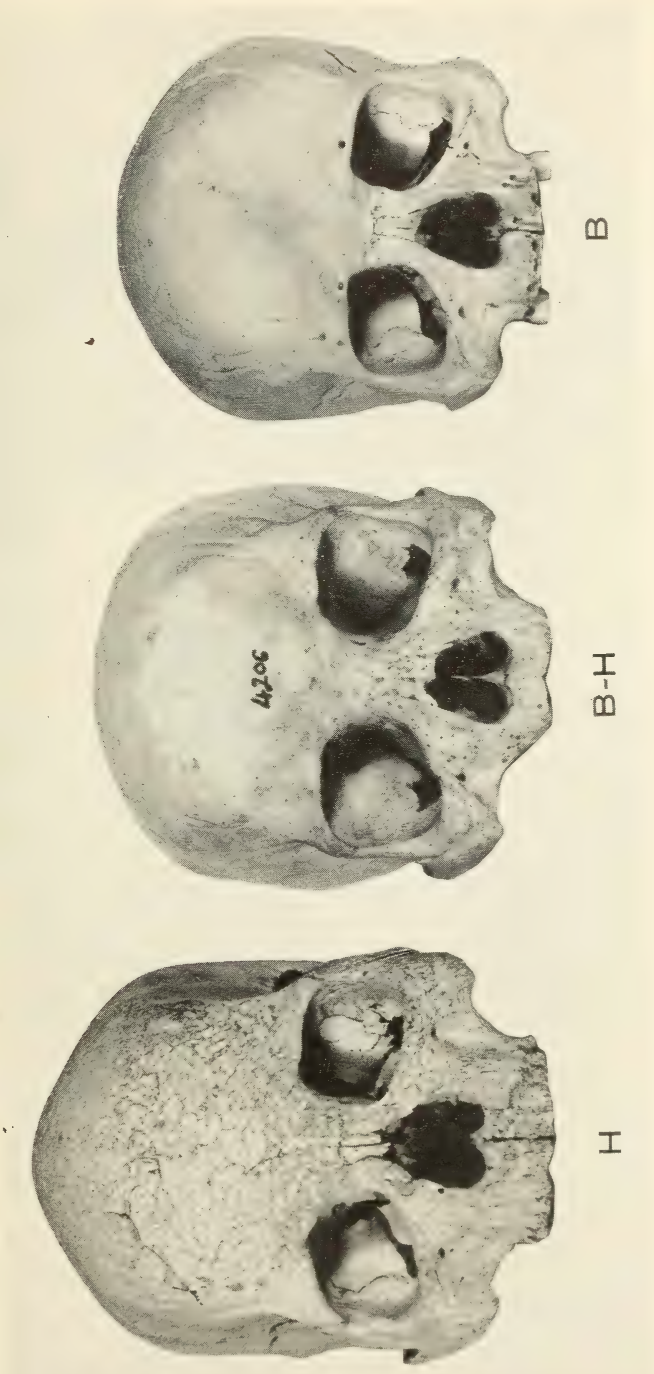
Plate I.—Photographs of three representative crania, seen from the front.
H, typical Hottentot. B-H, Bush-Hottentot hybrid. B, typical Bushman.

Plate II.—Photographs of three representative crania, seen from the side.
H, typical Hottentot. B-H, Bush-Hottentot hybrid. B, typical Bushman.

Plate III.—Photographs of three representative crania, seen from above.
H, typical Hottentot. B-H, Bush-Hottentot hybrid. B, typical Bushman.

Plate IV.—Side view of three mandibles belonging to different population groups, to illustrate the shape of the ramus of the mandible.

A, typical Hottentot: index of ramus, 91·7.
B, Cape Coloured: index of ramus, 82·2.
C, European: index of ramus, 58·2.



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H

B-H

B

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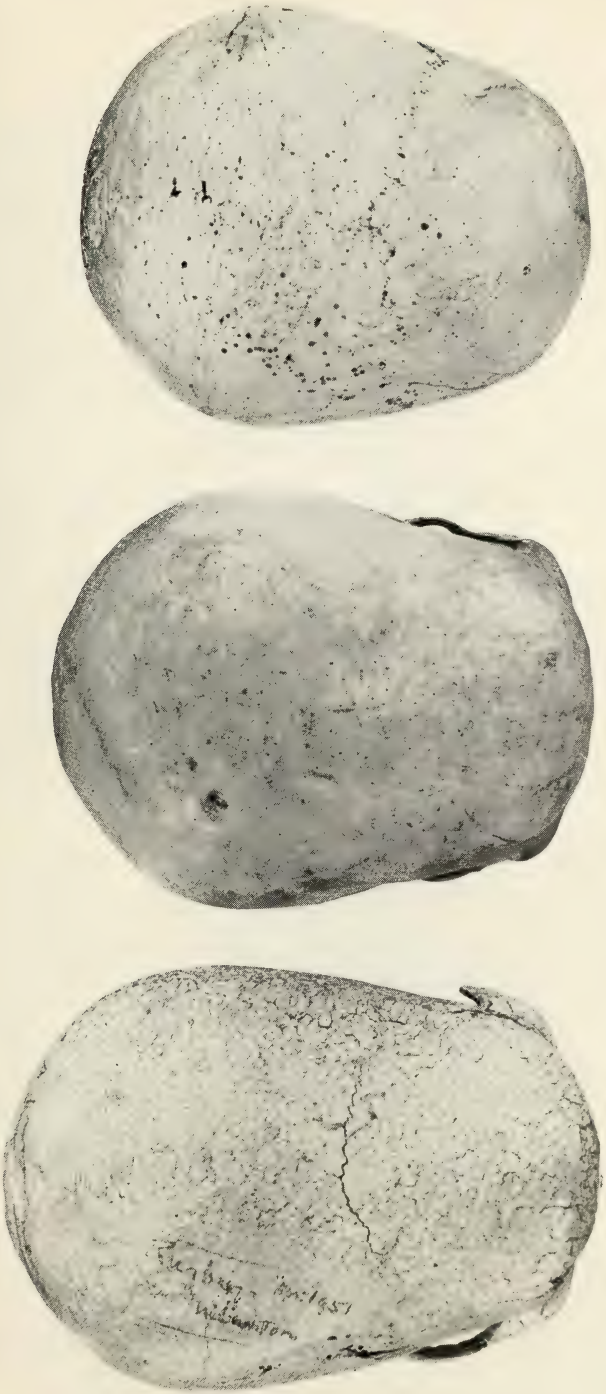

B

B-H

H

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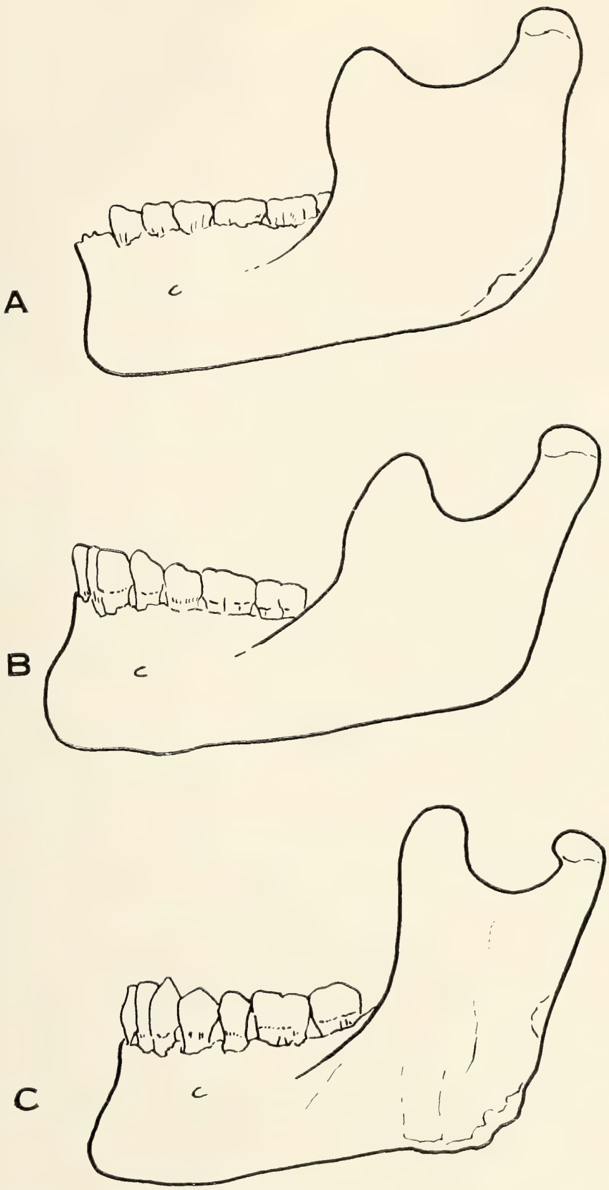

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